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# Transportation and Forestry, Fishing, and Related Occupations

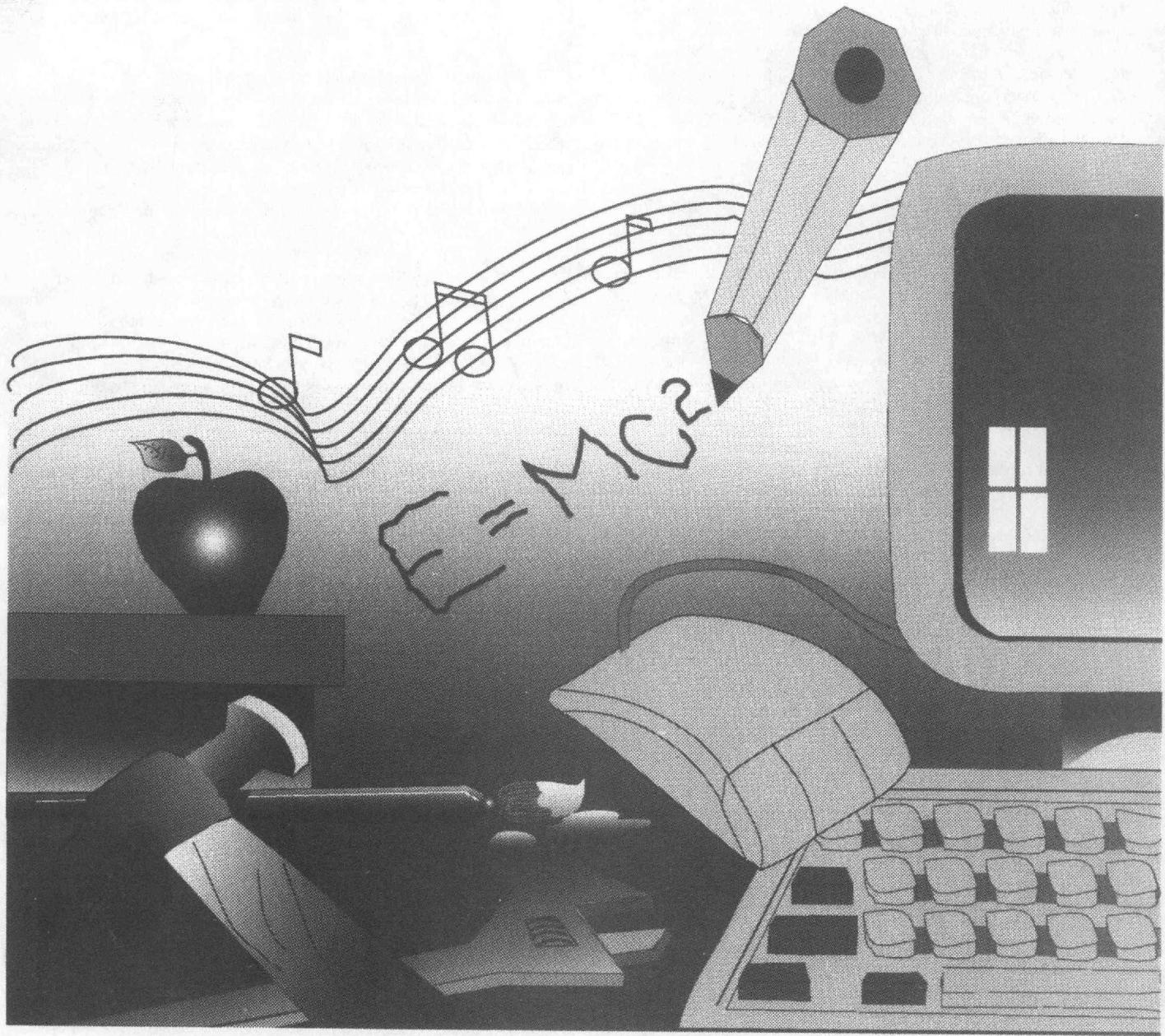


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## Busdrivers

(D.O.T. 909.663; 913.363, .463-010, and .663-014)

### Nature of the Work

Busdrivers provide transportation for millions of Americans every day. Intercity busdrivers transport people between regions of a State or of the country; local transit busdrivers, within a metropolitan area or county; and school busdrivers, to and from schools and related events. They follow time schedules and routes over highways and city and suburban streets to provide passengers with an alternative to the automobile and other forms of transportation.

Intercity busdrivers and local transit busdrivers report to their assigned terminal or garage, where they receive tickets and transfers and prepare trip report forms. School busdrivers do not have to report to an assigned terminal or garage. Instead, school busdrivers often have the choice to take their bus home, or to park it in another more convenient area. Before beginning their routes, drivers check their vehicle's tires, brakes, windshield wipers, lights, oil, fuel, water, and safety equipment, such as fire extinguishers, first aid kits, and emergency reflectors.

Drivers pick up and discharge passengers at bus stops or stations, or, in the case of students, at corners or in front of houses. Intercity and local transit busdrivers collect fares; answer questions about schedules, routes, and transfer points; and sometimes announce stops. School busdrivers do not collect fares. Instead, they prepare weekly reports with the number of students, trips or runs, work hours, and miles and the amount of fuel consumption. Time schedules and routes are set by their supervisors.

Busdrivers' days are run by the clock, as they must adhere to schedules. Drivers must try to keep up when traffic is heavier than normal, yet operate safely. However, they cannot let light traffic put them ahead of schedule so that they miss passengers.

Busdrivers must be alert to prevent accidents, especially in heavy traffic or in bad weather, and to avoid sudden stops or swerves which jar passengers. School busdrivers must exercise particular caution when children are getting on or off the bus. They must know and reinforce the same set of rules used elsewhere in the school system.

Bus routes vary. Local transit busdrivers may make several trips each day over the same city and suburban streets, stopping as frequently as every few blocks. School busdrivers also drive the same routes each day, stopping frequently to pick up pupils in the morning and return them to their homes in the afternoon. School busdrivers may also transport students and teachers on field trips or to sporting events. Intercity busdrivers may make only a single one-way trip to a distant city or a round trip each day, stopping at towns just a few miles apart or only at large cities hundreds of miles apart. Drivers who operate chartered buses pick up groups, take them to their destination, and generally remain with them until they return. Trips frequently last more than 1 day, and if they are assigned to a tour, they may be away for a week or more.

Local transit busdrivers submit daily trip reports with a record of tickets and fares received, trips made, and significant delays in schedule, and report mechanical problems. All busdrivers must be able to fill out accident reports, when necessary. Intercity drivers that drive across State or National boundaries must comply with U.S. Department of Transportation requirements, such as completing vehicle inspection reports and recording distances traveled and the periods of time they spend driving, performing other duties, and off duty.

### Working Conditions

Driving a bus through heavy traffic while dealing with passengers is not physically strenuous, but it can be stressful and fatiguing. On the other hand, many drivers enjoy the opportunity to work without direct supervision, with full responsibility for the bus and passengers.

Intercity busdrivers may work nights, weekends, and holidays and often spend nights away from home, where they stay at hotels at

company expense. Senior drivers with regular routes have regular weekly work schedules, but others do not have regular schedules and must be prepared to report for work on short notice. They report for work only when called for a charter assignment or to drive extra buses on a regular route. Intercity bus travel and charter work tend to be seasonal, so, from May through August, drivers may work the maximum number of hours per week that regulations allow. During winter, less senior drivers may work infrequently, except for busy holiday travel periods, and may be furloughed for periods of time.

School busdrivers work only when school is in session. Most work 20 hours a week or less, driving one or two routes in the morning and afternoon. Drivers taking field or athletic trips or who also have mid-day kindergarten routes may work more hours a week.

Regular local transit busdrivers usually have a 5-day workweek; Saturdays and Sundays are considered regular workdays. Some drivers work evenings and after midnight. To accommodate commuters, many work "split shifts," for example, 6 a.m. to 10 a.m. and 3 p.m. to 7 p.m., with time off in between.

### Employment

Busdrivers held about 561,000 jobs in 1990. Most worked part time. Nearly 3 out of 4 drivers worked for school systems or companies that provide school bus services under contract, as shown in the accompanying chart. Most of the remainder worked for private and local government transit systems; some also worked for intercity and charter buslines.

### Training, Other Qualifications, and Advancement

Busdriver qualifications and standards are established by State and Federal regulations. Federal regulations require drivers who operate vehicles designed to transport 16 or more passengers to obtain a Commercial Driver's License (CDL) from the State in which they live.

The Federal regulations mandated by the Motor Vehicle Safety Act of 1986 have been implemented and reinforced by the States. Under the provisions of the 1986 Act, States must have their commercial drivers licence programs in conformance with the standards of the Act. This is an ongoing process and most of the States are implementing and reinforcing this process. The States now act in compliance with the Federal regulations. In order to be licensed, applicants for a CDL must take and pass a knowledge test and demonstrate that they have the skills necessary to operate a commercial motor vehicle safely. Applicants are also required to pass a behind-the-wheel road test in the type of vehicle that they will be operating. Trainees must be accompanied by another driver who has a CDL until they are issued a CDL. In addition, interstate busdrivers must meet additional qualifications. For example, they must be at least 21 years old and pass a physical examination. State agencies and municipalities may also have additional requirements for drivers who operate within their jurisdictions.

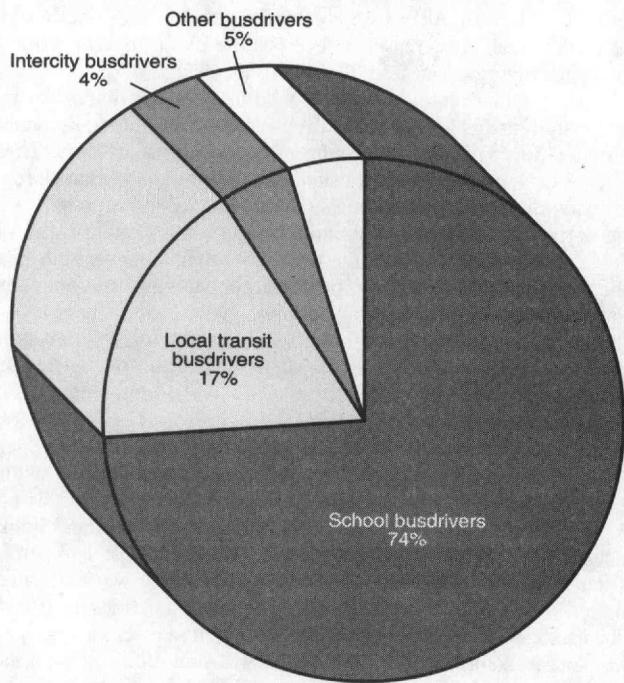
Drivers should be in good health and have at least 20/40 vision with or without glasses, good hearing, and normal use of their arms



Busdrivers pick up and discharge passengers at bus stops.

## Most busdrivers operate school buses.

Distribution of wage and salary employment, 1990



Source: Bureau of Labor Statistics

and legs. Many employers prefer high school graduates and require a physical examination and a written test of ability to follow complex bus schedules. Many intercity and public transit bus companies prefer applicants who are at least 24 years of age; some require several years of bus or truck driving experience. Public transit and interstate busdrivers are also required to submit to drug screening as a condition of employment. In some States, school busdrivers must pass a background investigation to uncover any criminal record or history of mental problems.

Since busdrivers deal with passengers, they must be courteous. They need an even temperament and emotional stability because driving in heavy, fast-moving, or stop-and-go traffic and dealing with passengers can be stressful.

Most intercity bus companies and local transit systems give driver trainees 2 to 8 weeks of classroom and "behind-the-wheel" instruction. In the classroom, trainees learn U.S. Department of Transportation and company work rules, safety regulations, State and municipal driving regulations, and safe driving practices. They also learn to read schedules, determine fares, keep records, and deal courteously with passengers.

School busdrivers are also required to obtain a Commercial Driver's License from the State in which they live by April 1, 1992. Many persons who enter school busdriving have never driven any vehicle larger than an automobile. They receive between 1 and 4 weeks of driving instruction plus classroom training on State and local laws, regulations, and policies of operating school buses; safe driving practices; driver-pupil relations; first aid; disabled student special needs; and emergency evacuation procedures.

During training, busdrivers practice driving on set courses. They practice turns and zigzag maneuvers, back up, and drive in narrow lanes. Then they drive in light traffic and, eventually, on congested highways and city streets. They also make trial runs, without passengers, to improve their driving skills and learn the routes. Local transit trainees memorize and drive each of the runs operating out of their assigned garage. New drivers begin with a "break-in" period. They make regularly scheduled trips with passengers, accompanied by an experienced driver who gives helpful tips, answers questions, and evaluates the new driver's performance.

New intercity and local transit drivers usually are placed on an "extra" list to drive charter runs, extra buses on regular runs, special runs (for example, during morning and evening rush hours and to sports events), and substitute for regular drivers who are ill or on vacation. New drivers remain on the extra list, and may work only part time, perhaps for several years, until they have enough seniority to get a regular run.

Senior drivers may bid for runs they prefer, such as those with more work hours, lighter traffic, weekends off, or, in the case of intercity busdrivers, higher earnings or fewer workdays per week.

Opportunities for promotion generally are limited. However, experienced drivers may become supervisors or dispatchers, who assign buses to drivers, check whether drivers are on schedule, reroute buses to avoid blocked streets or other problems, and dispatch extra vehicles and service crews to scenes of accidents and breakdowns. In transit agencies with rail systems, drivers may become train operators or station attendants. A few drivers become managers. Promotion in publicly owned bus systems is often by competitive civil service examination.

### Job Outlook

Employment of busdrivers is expected to increase faster than the average for all occupations through the year 2005. Persons seeking jobs as busdrivers over the 1990-2005 period will encounter good opportunities. The number of job openings for school busdrivers is greater because of the growing needs of pupil transportation. There will be more competition for higher paying intercity and public transit busdriver positions.

The number of school busdrivers is expected to increase as a result of growth in elementary and secondary school enrollments. In addition, as more of the Nation's population is concentrated in suburban areas—where students generally ride school buses—and less in the central cities—where transportation is not provided for most pupils—more school busdrivers will be needed.

Employment of local transit and intercity drivers will grow as bus ridership increases. Local and intercity travel is expected to increase, as the population and labor force grow and incomes rise, but most growth will probably be in more expensive air and automobile transportation rather than in bus travel. Some growth of ridership is expected, however, in rapidly growing Sunbelt States.

Opportunities for busdriver jobs should generally be good for persons with good driving records who are able to qualify for a Commercial Driver's License. Opportunities should be best in metropolitan areas that are growing rapidly. School busdriving jobs should be easiest to get, since most are part time and have higher turnover. There may continue to be competition for local transit and intercity busdriver jobs in some areas, since many of these positions offer relatively high wages and attractive benefits.

Full-time busdrivers are rarely laid off during recessions. However, part-time local transit and intercity busdrivers may be if bus ridership decreases, since fewer extra buses would be needed. Seasonal layoffs are common. Many intercity busdrivers with little seniority, for example, are furloughed during the winter when regular schedule and charter business falls off; school busdrivers seldom work during the summer or school holidays.

### Earnings

Median weekly earnings of busdrivers who worked full time were \$370 in 1990. The middle 50 percent earned between about \$270 and \$500 a week. The lowest 10 percent earned less than \$200 a week, while the highest tenth earned more than \$610 a week.

According to the American Public Transit Association, local transit busdrivers in areas with more than 1 million inhabitants had a median hourly wage rate of \$13.80 in early 1990; in areas with fewer than 100,000 inhabitants, drivers had a median hourly rate of \$9.90. The average starting rate in most cities was 75 percent of the top rate. Generally, drivers could reach the top rate in 3 or 4 years.

Earnings of intercity busdrivers depend primarily on the number of miles they drive. In 1990, beginning intercity drivers worked about 6 months out of the year and earned about \$22,000 while many senior drivers who worked year round earned more than \$48,000.

According to a survey by the Educational Research Service, the average rate for school busdrivers employed by public school systems was \$9.52 an hour during the 1990-91 school year. The mean of the lowest hourly rate was \$8.40 while the mean of the highest hourly rate was \$10.84.

The fringe benefits that busdrivers receive from their employers vary greatly. Most intercity and local transit busdrivers receive paid health and life insurance, sick leave, and free bus rides on any of the regular routes of their line or system. Drivers who work full time also get as much as 4 weeks of vacation annually. Most local transit busdrivers are also covered by dental insurance and pension plans. School busdrivers get sick leave, and most are covered by health and life insurance and pension plans, but because they do not work when school is not in session, they do not get vacation leave. In a number of States, local transit and school busdrivers who are employed by local governments are covered by a State-wide public employee pension system.

Most intercity and many local transit busdrivers are members of the Amalgamated Transit Union. Local transit busdrivers in New York and several other large cities belong to the Transport Workers Union of America. Some drivers belong to the United Transportation Union and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America.

#### Related Occupations

Other workers who drive vehicles on highways and city streets are taxidrivers, truckdrivers, and chauffeurs.

#### Sources of Additional Information

For further information on employment opportunities, contact local transit systems, intercity buslines, school systems, or the local offices of the State employment service.

Information on school busdriving is available from:

- ☛ National School Transportation Association, P.O. Box 2639, Springfield, VA 22152.

General information on local transit busdriving is available from:

- ☛ American Public Transit Association, 1201 New York Ave. NW., Suite 400, Washington, DC 20005.

For information on intercity and charter busdriver careers contact:

- ☛ American Bus Association, 1015 15th St. NW., Suite 250, Washington, DC 20005.

General information on busdriving is available from:

- ☛ National Highway Traffic Safety Administration, U.S. Department of Transportation, NTS-22, 400 7th St. SW., Washington, DC 20590.

## Fishers, Hunters, and Trappers

(D.O.T. 197.133-010, -018; 441; 442; 443; 447; 449.664, .667, .687; 461)

#### Nature of the Work

Fishers, hunters, and trappers gather marine and animal life for human consumption and for animal feed, bait, and other industrial uses, and manage animal life for research and control purposes. The range of occupational functions reflects the wide variety of marine and animal life and their environmental conditions.

Gathering sea life hundreds of miles from shore with vessels—large fishing boats capable of hauling a catch of tens of thousands of pounds of fish—requires a crew of up to 30 fishers—a captain, or skipper, a first mate and sometimes a second mate, boatswains, and other deckhands.

The captain plans and oversees the fishing operation—the marine life to be sought, the location of the best fishing grounds, the method of capture, the duration of the trip, and the sale of the catch. The captain ensures that the fishing vessel is in suitable condition; oversees the purchase of supplies, gear, and equipment such as fuel, netting, and cables; and hires qualified crew members and assigns their duties. The vessel's course is plotted with navigation aids such as compasses, sextants, and charts; it is maintained using electronic equipment such as autopilots, loran, and satellites to ascertain position. The ships also use radar to avoid obstacles and depth sounders

to indicate the water depth and the existence of marine life between the vessel and sea bottom. The captain directs the fishing operation through his mates and other officers, and records all daily activities in the ship's log. Upon returning to port, the captain arranges for the sale of the catch directly to buyers or through a fish auction and ensures that each crew member receives the prearranged portion of the adjusted net proceeds from the sale of the catch.

The mate—the captain's assistant, who must be familiar with navigation requirements and the operation of all electronic equipment—assumes control of the vessel when the captain is off duty. These on-off periods, called watches, usually last 6 hours. The mate's regular duty, with the help of the boatswain and under the captain's oversight, is to direct the fishing operations and sailing responsibilities of the deckhands. These include the operation, maintenance, and repair of the vessel and the gathering, preservation, stowing, and unloading of the catch.

Boatmen—highly experienced deckhands with supervisory responsibilities—and the other deckhands carry out the sailing and fishing operations. Prior to departure, they load equipment and supplies, either manually or with hoisting equipment, and untie lines from other boats and the dock. When necessary, they repair fishing gear, equipment, nets, and accessories. They operate the fishing gear, letting out and pulling in nets and lines and extract the catch—such as pollock, flounder, menhaden, and tuna—from the nets or lines' hooks. Deckhands use dip nets to prevent the escape of small fish and gaffs to facilitate the landing of large fish. The catch is then washed, salted, iced, and stowed away. Additionally, deckhands must ensure that the decks are clear and clean at all times and that the vessel's engines and equipment are kept in good working order. Upon return to port, they secure the vessel's lines to and from the docks and other vessels. Unless lumpers, or laborers, are hired, the deckhands unload the catch. (For information about merchant marine occupations, see the statement on water transportation occupations elsewhere in the *Handbook*.)

Most full-time and virtually all part-time fishers work on motorboats in relatively shallow waters and often in sight of land. Navigation and communications needs are modest, and there is little need for much electronic equipment and provisions for long stays at sea. Crews are small—usually only one or two fishers collaborate on all aspects of the fishing operation. This includes placing gill nets across the mouths of rivers or inlets, entrapment nets in bays and lakes, and pots and traps for shellfish such as lobsters and crabs. Dredges and scrapes are also used to gather shellfish such as oysters and scallops. Motorboats may also be used for diving operations. Depending upon the water's depth, divers—wearing a regulation diving suit with an umbilical (air line) or a scuba outfit and equipment—use spears to catch fish and nets and other equipment to gather shellfish, coral, and sponges. In very shallow waters, fish are caught from small boats with an outboard motor, rowboats, or by wading. Fishers use a wide variety of hand-operated equipment—for example, nets, tongs, rakes, hoes, hooks, and shovels—to gather finfish and shellfish, catch water animals such as frogs and turtles, and harvest marine life such as Irish moss and kelp.

While most fishers are involved with commercial fishing, some captains and deckhands are primarily involved with recreational fishing. Typically a group of people charter a fishing vessel—for periods ranging from several hours to a number of days—for sport fishing, socializing, and relaxation.

Hunters track, stalk, and kill their quarry. They usually operate alone or as members of a very small hunting party and may use dogs to locate and corner the quarry. They use guns and bows and arrows to hunt predatory animals such as bears; eradicate animal pests such as coyotes; and control the population of large game animals such as deer. Alligator hunters shoot their quarry after snaring it with baited hooks. A few hunters are involved in photographing or collecting animals for museums. Hunting activities are approved and monitored by the appropriate Federal, State, or local government agencies. Exceptions are made for American Indians on Indian reservations and native Alaskans who may hunt unconditionally on their own and their tribes' behalf.

Trappers catch animals or birds using baited, scented, or camouflaged traps, snares, cages, or nets. Many hunters and trappers skin

animals and prepare and sell the pelts and skins. Trappers also may be involved with animal damage control, wildlife management, disease control, and research activities. Animal damage control involves the disposition or relocation of animals that are a nuisance or pose a potential danger—for example, coyotes and bears. Wildlife management involves the relocation of animals—for example, muskrats and beavers—to deal with environmental disruption or animal population imbalance. Disease control involves rabid animals that threaten public or animal health. Research activities include blood sampling for health determination and the banding of wildfowl to ascertain migratory movements.

### Working Conditions

Fishing, hunting, and trapping operations are conducted under various environmental conditions. Fishing vessels may be hampered or even imperiled by sudden storms, fog, or wind. Divers are affected by murky water and unexpected shifts in underwater currents. Hunters and trappers are hampered or disrupted by rain or snow storms.

Fishers, hunters, and trappers work under hazardous conditions, and often help is not readily available. Malfunctioning navigation or communication equipment may lead to collisions or even shipwrecks. Malfunctioning fishing gear poses a danger to the crew. Fishers must guard against entanglement in fishing nets and gear, slippery decks resulting from fish processing operations, ice formation in the winter, or being swept overboard—a fearsome situation in stormy seas or at night. Treatment for serious injuries may have to await transfer to a hospital. Divers must guard against entanglement of air lines, malfunction of scuba equipment, decompression problems, or attacks by predatory fish. Hunters and trappers face numerous hazards such as the unexpected assault of a predator or pest animal, falling branches

and trees, slippery ground, falling through ice on ponds, hidden roots and vines, poisonous plants, and insect pests. Danger from incapacitating injuries is especially high, because these individuals usually work alone. A disabled vehicle or isolation because of a storm can also present serious problems.

These activities entail strenuous work and long hours. Fishing trips may require a stay of several weeks or months hundreds of miles away from home port. The pace of work varies—intense while netting and hauling the catch aboard and relatively relaxed while traveling between home port and the fishing grounds. However, lookout watches—usually 6 hours long—are a regular responsibility and crew members must be prepared to stand watch at prearranged times of the day or night. Although fishing gear has improved and operations have become more mechanized, handling gear and processing fish are strenuous. Even though fishers on newer vessels may enjoy improved living quarters and amenities such as television and shower stalls, they still experience the aggravations of confined conditions, continuous personal contact, and the absence of family. Hunters and trappers may travel miles by car and then carry equipment and supplies on foot through swamps, forests, and over rugged terrain. Long hours—dawn to dusk—often are the rule, and many spend several lonely days camped out in sparsely populated forested or mountainous areas.

### Employment

Fishers, hunters, and trappers held an estimated 61,000 jobs in 1990. Six of every 10 were self-employed. Many fishers, hunters, and trappers worked part time, particularly in the summer, when demand for these workers peaks.

Captains, mates, and deckhands on fishing vessels accounted for the majority of the jobs. Trappers, and to lesser extent hunters, accounted for the remaining jobs.

The overwhelming majority of fishers, hunters, and trappers work in the fishing, hunting, and trapping industry. Significant numbers of fishers are involved in sport fishing activities while others work for museums—primarily in aquariums, oceanariums, and marine museums. Small numbers are employed in many other industries.

### Training, Other Qualifications, and Advancement

Fishers generally acquire their occupational skills on the job, many as members of families involved in fishing activities. No formal academic requirements exist. However, young persons can expedite their entrance into these occupations by enrolling in 2-year vocational-technical programs offered by secondary schools, primarily in coastal areas. In addition, the University of Rhode Island offers a bachelor's degree program in fishery technology that includes courses in seamanship, vessel operations, marine safety, navigation, vessel repair and maintenance, health emergencies, and fishing gear technology, and is accompanied by hands-on experience.

Experienced fishers may find short-term workshops offered through the National Oceanic and Atmospheric Administration (NOAA) and various postsecondary institutions especially useful. These programs provide a good working knowledge of electronic equipment used in navigation and communication and the latest improvements in fishing gear.

Captains and mates on larger fishing vessels—at least 200 gross tons—must be licensed. Captains of sport fishing boats used for charter, regardless of size, also must be licensed. Crew members involved in fish processing on fishing vessels of at least 100 tons may need a merchant mariner's document. These documents and licenses are issued by the U.S. Coast Guard to individuals who meet the stipulated health, physical, and academic requirements.

Fishers must be in good health and possess physical strength. Coordination and mechanical aptitude are necessary to operate, maintain, and repair the ship's equipment and fishing gear. Fishers need perseverance to work long hours on the sea, often under difficult conditions. On larger vessels, they must be able to work as members of a team. They must be patient, yet always alert, to overcome the boredom of long watches when not engaged in fishing operations. The ability to assume any deckhand's functions, on short notice, is important. Mates must have supervisory ability and be able to assume any deckhand's and the captain's duties, when necessary. The captain



Physical strength is required to handle crab nets.

must be highly experienced, mature, decisive, and possess the necessary business skills. Captains with initiative and the required capital often become boat owners.

On fishing vessels, most fishers begin as deckhands. Deckhands whose experience and interests are in ship engineering—maintenance and repair of ship engines and equipment—can eventually become licensed chief engineers on large commercial vessels after meeting the U.S. Coast Guard's experience, physical, and academic requirements. Divers in fishing operations can enter commercial diving activity—for example, ship repair and pier and marina maintenance—preferably after completion of a certified training program sponsored by an educational institution or industry association. Experienced, reliable deckhands who display supervisory qualities may become boatswains. Boatswains may, in turn, become second mates, first mates, and finally captains. Almost all captains become self-employed, and the overwhelming majority eventually own or have an interest in one or more fishing ships. Some may choose to run a sport or recreational fishing operation. When their seagoing days are over, experienced individuals may work in or, with the necessary capital, operate stores selling fishing and marine equipment and supplies. Some captains may assume advisory or administrative positions in industry trade associations or government offices such as harbor development commissions, or teaching positions in industry-sponsored workshops or in educational institutions.

Hunters and trappers generally acquire their knowledge of wildlife and hunting and trapping equipment and supplies through experience. Most are members of rural families for whom hunting and trapping have been a way of life for generations. There is no formal training for hunters. Inexperienced individuals should join an established sports association to observe professional demonstrations and gain knowledge of hunting weapons and related equipment and tracking and survival techniques. After acquiring the mandatory State hunting license, they should hunt with an experienced hunter.

Trappers may undergo various forms of training. For those interested in the sale of animals and their skins, pelts, or furs, experience is fundamental. Inexperienced trappers may serve an internship under the supervision of a professional trapper and take trapper education programs. Trapper education programs are offered by the State wildlife department or a State trappers association; in some States, these programs are mandatory. A trapper's license permits the trapping of animals forbidden to unlicensed trappers. Trappers interested in research associated with control and management of wildlife populations and disease may take courses, or even complete a degree program, in wildlife biology, wildlife management, or related fields.

Hunters and trappers must be in good health, possess physical strength and stamina, and have the desire, patience, and ability to work outdoors, sometimes for long periods, under difficult conditions. Maturity and judgment are important to deal with hazards. Good physical coordination and mechanical aptitude are necessary to safely and skillfully use hunting weapons and tracking equipment and to maintain camping and other gear.

Hunters with extensive experience may work as guides for hunting parties. Those with initiative, business skills, and the required capital may become self-employed outfitters, some of whom own sites in the wilds. Outfitters organize hunting parties, select hunting areas, and assume responsibility for the hunting expedition—providing for equipment and supplies, instructing the party members in hunting techniques and safety measures, and overseeing leisure activities during the expedition.

Experienced trappers with the appropriate academic background may enter other occupations, such as wildlife technician, wildlife biologist, or wildlife refuge manager. Professional trappers with business skills and initiative may become self-employed fur trapper-buyers.

## Job Outlook

Overall, employment of fishers, hunters, and trappers is expected to increase more slowly than the average for all occupations through the year 2005. Most job openings will arise from the need to replace workers who retire or leave the occupation for other reasons. Turnover is quite high, reflecting the strenuous and hazardous nature

of the job, low training requirements, and lack of steady, year-round employment opportunities.

Different factors will affect employment among these occupations. Demand for captains and mates should be spurred by the expansion in commercial fishing operations, which is expected to occur offshore and require more large fishing vessels. Demand for skippers of sport fishing boats is expected to increase as recreational fishing activities continue to expand. In addition, fishing parties are increasingly using chartered boats with experienced crews to navigate and to provide instruction in and help with fishing activities.

Employment growth of deckhands, on the other hand, may be somewhat restrained by the use of sophisticated electronic equipment for navigation, communication, and fish location and improvements in fishing gear, which have greatly increased the efficiency of fishing operations and have limited the expansion in crew size. Also, little increase is expected in near-shore or inland fishing operations, where the stock of fish is being adversely affected by overfishing and pollution.

Barring legislation permitting expanded professional hunting and trapping activity, limited growth is expected in the employment of hunters and trappers. In addition, trapping activities are increasingly becoming ancillary duties of wildlife scientists and technicians and related workers.

## Earnings

Earnings of fishers, hunters, and trappers are generally highest in the summer—when demand for their services peaks and environmental conditions are favorable—and lowest during the winter. Many full-time and most part-time workers supplement their income by working in other activities during the off-season. For example, fishers may work in seafood processing plants, establishments selling fishing and marine equipment, or in construction. Hunters may work as self-employed guides, for an outfitter, or in stores selling guns or hunting and related equipment. Trappers may work in stores selling trapping and related equipment.

Earnings of fishers vary widely depending upon the specific occupational function, the size of the ship, and the amount and value of the catch. The costs of the fishing operation—operating the ship, repair and maintenance of gear and equipment, and the crew's supplies—are deducted from the sale of the catch. The net proceeds are distributed among the crew members in accordance with a prearranged formula. Generally, the ship's owner—usually its captain—receives half of the net proceeds, which covers any profit as well as the depreciation, maintenance, and replacement costs of the ship. In 1990, the annual income of most captains ranged from \$25,000 to \$90,000. Mates on these vessels generally earned less than one-half of this—slightly more than other crew members. Earnings of fishers on motorboats are substantially lower, on the average.

Information about earnings of self-employed hunters and trappers is not available. During 1991, most hunters and trappers in the Federal Government started between \$17,500 and \$23,000 a year. Salaries in State and local governments generally were lower.

## Related Occupations

Numerous occupations involve activities similar to those of fishers, hunters, and trappers. Among these are animal caretaker, animal control officer, aquarist, fish caretaker, fish farmer, fishing guide, fish hatchery worker, fish warden, game warden, harbor pilot, hunting guide, outfitter, pest control officer, shellfish grower and bed worker, and wildlife management specialist.

## Sources of Additional Information

For general information about fishing occupations, contact:

- ☛ National Oceanic and Atmospheric Administration, Office of Public Affairs, 1335 East-West Hwy., Silver Spring, MD 20910.

Information about sport or recreational fishing occupations is available from:

- ☛ Sport Fishing Institute, 1010 Massachusetts Ave. NW., Washington, DC 20001.

Names of postsecondary schools offering fishing and related marine educational programs are furnished by:

- ☛ Marine Technology Society, Suite 906, 1828 L St. NW., Washington, DC 20036-5104.

Information on licensing of captains and mates and requirements for merchant mariner documentation is available from the U.S. Coast Guard Marine Inspection Office or Marine Safety Office in your State, or:

- Merchant Vessel Personnel Division, U.S. Coast Guard, 2100 Second St. SW., Washington, DC 20593.

For information about certified training programs for diving (umbilical) careers, contact:

- College of Oceaneering, International Diving School, 272 S. Fries Ave., Wilmington, CA 90744.

For information on careers in hunting and related activities, contact:

- National Rifle Association, Hunting Services Division, 1600 Rhode Island Ave. NW., Washington, DC 20036.

## Gardeners and Groundskeepers

(D.O.T. 406.381-010, .683-010, .684-010, -014, -018, .687-010; 408.161-010, .684-010, and .687-014)

### Nature of the Work

Attractively designed, healthy, and well-maintained lawns, gardens, trees, and shrubbery create a positive first impression, establish a peaceful mood, and increase property values. A growing number of individuals and organizations rely on gardeners and groundskeepers to care for them.

Some gardeners work on large construction projects, such as office buildings and shopping malls. Following the plans drawn up by the landscape architect, gardeners plant trees, hedges, and flowering plants and apply mulch for protection. For residential customers, gardeners terrace hillsides, build retaining walls, and install patios, as well as plant trees and shrubs.

Gardeners working for homeowners, estates, and public gardens feed, water, and prune the flowering plants and trees and mow and water the lawn. Some landscape gardeners, called lawn service workers, specialize in maintaining lawns and shrubs for a fee. A growing number of residential and commercial clients, such as managers of office buildings, shopping malls, multiunit residential buildings, and hotels and motels favor this full-service landscape maintenance. These workers perform a full range of duties, including mowing, edging, trimming, fertilizing, dethatching, and mulching. Those working for chemical lawn service firms are more specialized. They inspect lawns for problems and apply fertilizers, weed killers, and other chemicals.

Groundskeepers on athletic fields, golf courses, cemeteries, or parks have more varied duties, doing the work of a maintenance mechanic, as well. Groundskeepers who care for athletic fields keep natural and artificial turf fields in top condition and mark out boundaries and paint team logos and names before events. Groundskeepers must make sure the underlying soil on natural turf fields has the proper consistency to sustain new sod. They generally resod the entire field once a year in order to provide the best possible footing for the athletes. They regularly mow, water, fertilize, and aerate the fields and control insects, weeds, and crabgrass with chemicals and apply fungicides to prevent diseases. Groundskeepers vacuum and disinfect synthetic turf after use in order to prevent growth of harmful bacteria. They also periodically remove the turf and replace the cushioning pad.

Greenskeepers maintain golf courses. They do many of the same things athletic turf groundskeepers do. In addition, greenskeepers periodically relocate the holes on putting greens to eliminate uneven wear of the turf and add interest and challenge to the game. Greenskeepers also keep canopies, benches, ball washers, and tee markers repaired and freshly painted.

Cemetery workers prepare graves and maintain cemetery grounds. They dig graves to specified depth, generally using a back-hoe. They may place concrete slabs on the bottom and around the sides of the grave to line it for greater support. When readying a site for the burial ceremony, they position the casket-lowering device over the grave, cover the immediate area with an artificial grass carpet, erect a canopy, and arrange folding chairs to accommodate mourners. They

regularly mow grass, prune shrubs, plant flowers, and remove debris from graves. They also must periodically build the ground up around new gravesites to compensate for settling.

Groundskeepers in parks and recreation facilities care for lawns, trees, and shrubs, maintain athletic fields and playgrounds, clean buildings, and keep parking lots, picnic areas, and other public spaces free of litter. They may also remove snow and ice from roads and walkways, erect and dismantle snow fences, and maintain swimming pools. These workers inspect buildings, and equipment, make needed repairs, and keep everything freshly painted.

Gardeners and groundskeepers use handtools such as shovels, rakes, pruning saws, saws, hedge and brush trimmers, and axes, as well as power lawnmowers, chain saws, snow blowers, and electric clippers. Some use equipment such as tractors and twin-axle vehicles. Park, school, cemetery, and golf course groundskeepers may use sod cutters to harvest sod that will be replanted elsewhere. Athletic turf groundskeepers use magnetic sweepers and vacuums and other devices to remove water from athletic fields. In addition, some workers in large operations use spraying and dusting equipment.

### Working Conditions

Many of the jobs for gardeners and groundskeepers are seasonal, mainly in the spring and summer, when cleanup, planting, and mowing and trimming take place. Gardeners and groundskeepers work outdoors in all kinds of weather. They frequently are under pressure to get the job completed, especially when they are preparing for scheduled events, such as athletic competitions or burials.

They may work with pesticides, insecticides, and other chemicals and must exercise safety precautions to prevent exposure. They also work with dangerous equipment and tools such as power lawnmowers, chain saws, and electric clippers.

### Employment

In 1990, gardeners and groundskeepers held about 874,000 jobs. About 3 out of 10 worked for lawn and garden services. About 1 out of 10 worked for private households and estates. Many worked for firms that operate real estate; for local government, including parks departments, and recreational facilities such as golf courses, race tracks, and amusement parks. Others were employed by schools, hospitals, cemeteries, hotels, retail nurseries, and garden stores.

Approximately 1 out of 5 was self-employed, providing landscape maintenance directly to customers on a contract basis.



Gardeners and groundskeepers work outdoors in all kinds of weather.

About 1 out of 3 gardeners and groundskeepers worked part time, most likely students working their way through school. Others working part time were older workers who might have been cutting back their hours as they approached retirement.

### Training, Other Qualifications, and Advancement

Entrance requirements for gardeners and groundskeepers are modest. Most entrants are high school graduates, but a high school diploma is not necessary for many jobs. Some people gain experience as a home gardener or by working in a nursery, a sod production operation, or for a tree service. High school students may gain experience in the Future Farmers of America.

There are no national standards for gardeners and groundskeepers, but some States require certification for workers who use chemicals extensively. Certification requirements vary, but usually include passing a test on the proper and safe use of insecticides, pesticides, and fungicides.

Employers prefer applicants with a good driving record and some experience driving a truck. Workers who deal directly with customers must get along well with people. Employers also look for responsible, self-motivated individuals, since many gardeners and groundskeepers work with little supervision.

Courses in agronomy, horticulture, and botany are helpful for advancement. There are many 2- and 4-year programs in landscape management, interiorscape, and ornamental horticulture. Courses include turfgrass management, equipment use and care, landscape design, plant biology, and irrigation. There are cooperative education programs in which students work alternate semesters or quarters for a lawn care or landscape contractor. Generally, a gardener or groundskeeper can advance to supervisor after several years of progressively responsible experience, including the demonstrated ability to deal effectively with both coworkers and customers. Supervisors can advance to grounds manager or superintendent for a golf course or other athletic facility, a cemetery, a campus, a school system, or manager of a lawn maintenance firm. Many gardeners and groundskeepers become landscape contractors.

The Professional Grounds Management Society offers certification to those managers who have a combination of 8 years of experience and formal education beyond high school.

### Job Outlook

Employment of gardeners and groundskeepers is expected to increase much faster than the average for all occupations through the year 2005 in response to increasing demand for gardening and landscaping services. Despite this growth, most job openings are expected to result from the need to replace workers who transfer to other occupations or leave the labor force.

Expected growth in the construction of commercial and industrial buildings, shopping malls, homes, highways, and parks and recreational facilities should stimulate demand for these workers. Developers are increasingly using landscaping services, both interior and exterior, to attract prospective buyers and tenants. In addition, owners of many existing buildings and facilities are upgrading their landscaping. Also, a growing number of homeowners are using lawn maintenance and landscaping services to enhance the beauty and value of their property as well as to conserve their leisure time. Growth in the number of parks, athletic fields, golf courses, cemeteries, and similar facilities also can be expected to add to the demand for these workers.

Job openings should be plentiful because the occupation is large and turnover is high. This occupation attracts many young people who are not committed to the occupation. Some take gardening or groundskeeping jobs to earn money for school, others only take these jobs until a better paying job is found. Because wages for beginners are low and the work is physically demanding, many employers have difficulty attracting enough workers to fill all openings.

### Earnings

Median weekly earnings of gardeners and groundskeepers were about \$270 in 1990; the middle 50 percent earned between \$200 and \$330. The lowest 10 percent earned less than \$170, and the top 10 percent earned more than \$450 a week.

According to a survey conducted by *Lawn Care Industry Magazine*, those who worked for chemical lawn care firms averaged between \$7.20 and \$8.50 an hour in 1990. In 1990, according to The Professional Grounds Management Society, seasonal laborers averaged \$6.10 an hour; permanent, year-round laborers, \$7.33; and supervisors \$9.40. Managers, who generally had a 4 year degree, averaged \$34,292 a year.

### Related Occupations

Gardeners and groundskeepers perform the most of their work outdoors. Others whose jobs may be performed outdoors are construction workers, nursery workers, farmers, horticultural workers, tree surgeon helpers, tree trimmers and pruners, and forest conservation workers.

### Sources of Additional Information

For career information, contact:

➤ Associated Landscape Contractors of America, Inc., 405 N. Washington St., Suite 104, Falls Church, VA 22046.

➤ National Landscape Association, 1250 I St. NW, Washington, DC 20005.

For career and certification information, contact:

➤ Professional Grounds Management Society, 10402 Ridgland Rd., Suite 4, Cockeysville, MD 21030.

## Material Moving Equipment Operators

(List of D.O.T. codes available on request from the Chief, Division of Occupational Outlook, Bureau of Labor Statistics, Washington, DC 20212.)

### Nature of the Work

Material moving equipment operators use machinery to move construction materials and other manufactured goods, earth, logs, petroleum products, grain, coal, and other heavy materials. Generally they move materials over short distances—around a construction site, factory, warehouse, or on or off trucks and ships. Operators control equipment by moving levers or foot pedals, operating switches, or turning dials. They may also set up and inspect equipment and make adjustments and minor repairs.

Material moving equipment operators usually are classified by the type of machines they operate. Those who operate bulldozers, cranes, loaders, and similar equipment are often called construction equipment operators even though they work in the mining, logging, utilities, and other industries as well as the construction industry. Others operate industrial trucks and tractors and similar equipment in manufacturing plants and warehouses. Some operate many kinds of equipment; others only one.

Crane and tower operators lift and move materials, machinery, or other heavy objects with mechanical booms and tower and cable equipment. Although some cranes are used on construction sites, most are used in manufacturing and other industries.

Excavation and loading machine operators run and tend machinery equipped with scoops, shovels, or buckets to excavate earth at construction sites and to load and move loose materials, mainly in the construction and mining industries.

Grader, dozer, and scraper operators remove, distribute, level, and grade earth with vehicles equipped with blades. In addition to the familiar bulldozers, they operate trench excavators, road graders, and similar equipment. Although many work in the construction industry, grader, dozer, and scraper operators also work for State and local governments, mainly in maintenance and repair work.

Hoist and winch operators lift and pull loads by using power-operated equipment. Most work in loading operations in construction, manufacturing, logging, transportation and public utilities, and mining.

Operating engineers are qualified to operate more than one type of the construction equipment discussed above. Although the term operating engineer often is applied to many construction machine operators, many work for State and local governments.

Industrial truck and tractor operators drive and control industrial trucks or tractors. A typical industrial truck, often called a forklift or

lift truck, has a hydraulic lifting mechanism and forks. Industrial truck operators use these to carry loads on a skid or pallet around a factory or warehouse. Industrial tractor operators pull trailers loaded with materials, goods, or equipment within factories and warehouses, or around outdoor storage areas.

Other material moving equipment operators tend air compressors or pumps at construction sites. Some operate oil or natural gas pumps and compressors at oil and gas wells and on oil and gas pipelines, and others operate ship loading and unloading equipment, conveyors, hoists, and other kinds of specialized material handling equipment such as mine or railroad tank car unloading equipment.

Material moving equipment operators may keep records of materials moved, and do some manual loading and unloading. They also may clean, fuel, and service their equipment.

### Working Conditions

Many material moving equipment operators work outdoors, in hot and cold weather, and sometimes in rain or snow. Industrial truck and tractor operators work mainly indoors, in warehouses or manufacturing plants. Some machines, particularly bulldozers and scrapers, are noisy and shake or jolt the operator. To avoid injury while operating an industrial truck, operators must take care to avoid roll-overs, collisions, and other accidents as well as protect materials and equipment from damage. While operating a bulldozer, care must be taken to keep it from overturning on a steep slope. However, these jobs have become much safer with the adoption of overhead guards on forklift trucks and roll bars on construction machinery. As with most machinery, most accidents can be avoided when proper operating procedures and safety practices are observed.

### Employment

Material moving equipment operators held over 1 million jobs in 1990. The following tabulation shows the makeup of this occupational group.

Industrial truck and tractor operators .....	431,000
Operating engineers.....	157,000
Grader, dozer, and scraper operators .....	93,000
Excavation and loading machine operators .....	74,000
Crane and tower operators.....	51,000
Hoist and winch operators .....	11,000
All other material moving and equipment operators .....	201,000

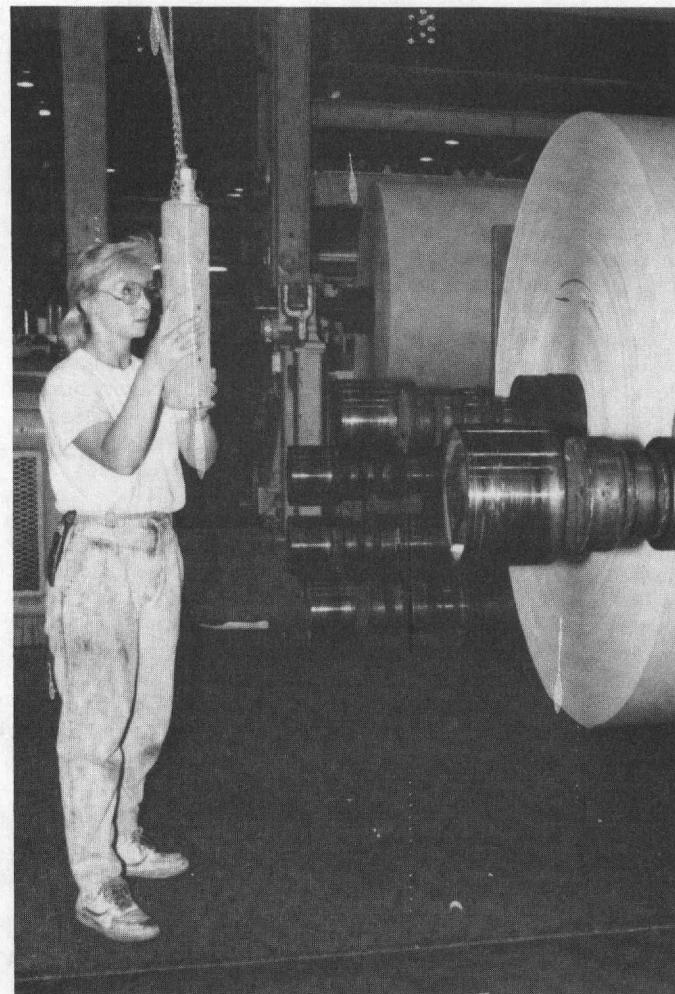
The largest proportion—one-third—of material moving equipment operators worked in manufacturing; most of these were industrial truck and tractor operators. More than one-fifth worked in the construction industry. Significant numbers worked in State and local governments and in the trucking and warehousing, wholesale trade, and mining industries. A few material moving equipment operators were self-employed.

Material moving equipment operators work in every section of the country. Some work in remote locations on large construction projects, such as highways and dams, or in factory or mining operations.

### Training, Other Qualifications, and Advancement

Operation of material moving equipment is usually learned on the job. Operators need a good sense of balance and the ability to judge distance as well as good eye-hand-foot coordination. Employers of material moving equipment operators prefer to hire high school graduates, although, for some equipment, persons with less education may occasionally be accepted. Mechanical aptitude and high school training in automobile mechanics are helpful because workers may perform some maintenance on their machines. Experience operating mobile equipment, such as farm tractors or heavy equipment in the Armed forces, is an asset.

Beginning material moving equipment operators handle light equipment under the guidance of an experienced operator. Later, they may operate heavier equipment such as bulldozers and cranes. However, some construction equipment operators are trained in a 3-year apprenticeship program administered by union-management committees of the International Union of Operating Engineers and the Associated General Contractors of America. Since apprentices learn to



*Operation of material moving equipment is usually learned on the job.*

operate a wider variety of machines than other beginners, they usually have better job opportunities. Apprenticeship programs consist of at least 3 years or 6,000 hours of on-the-job training and 144 hours a year of related classroom instruction.

Private vocational schools offer instruction in the operation of certain types of construction equipment. Completion of such a program may help a person get a job as a trainee or apprentice. However, persons considering such training should check the reputation of the school among employers in the area.

### Job Outlook

Overall employment of material moving equipment operators is expected to increase more slowly than the average for all occupations through the year 2005. Equipment improvements, including the growing automation of material handling in factories and warehouses, are expected to restrain growth of this occupation. The construction and manufacturing industries, where the majority of these workers are employed, are very sensitive to changes in economic conditions, so the number of job openings for material moving equipment operators in these industries may fluctuate widely from year to year. Over the projection period, however, many openings will arise as experienced workers transfer to other occupations or leave the labor force.

Employment of operating engineers is projected to grow faster than the average because of increased spending on the Nation's infrastructure. About 3 of every 4 work in construction and local government, industries that are associated with the construction, repair, and maintenance of highways, bridges, dams, harbors, airports, subways, water and sewage systems, and electric powerplant and transmission lines. Construction of schools, office and other commercial

buildings, and residential property also will stimulate demand for these workers.

Slower than average growth is expected for all other material moving equipment operators, reflecting productivity increases stemming from increased automation and growth of the industries where these occupations are concentrated. Employment of industrial truck and tractor operators—by far the largest occupation in this group—will grow slowly as a result of the improved maneuverability and efficiency of industrial trucks and tractors. While the volume of goods to be moved will increase as the economy grows, material handling systems in large factories and warehouses will continue to become more automated, resulting in fewer operator jobs. Some systems use computerized dispatching or onboard data communication devices to enable industrial truck and tractor operators to move goods more efficiently. In other systems, industrial trucks and tractors may be replaced by computer-controlled conveyor systems, overhead handling systems, and automated vehicles that don't require operators.

### Earnings

In 1990, median earnings of all material moving equipment operators were \$415 a week; the middle 50 percent earned between \$315 and \$570. Ten percent earned less than \$250 and 10 percent more than \$730. Median weekly earnings of crane and tower operators were \$480 in 1990; excavation and loading machine operators, \$430; grader, dozer, and scraper operators, \$410; industrial truck and tractor operators, \$370; operating engineers, \$500; and other material moving equipment operators, \$400. Pay scales generally are higher in metropolitan areas. Annual earnings of some workers may be lower than weekly rates would indicate because the amount of time they work can be limited by bad weather.

### Related Occupations

Other workers who operate mechanical equipment include truck and bus drivers, manufacturing equipment operators, and farmers.

### Sources of Additional Information

For further information about apprenticeships or work opportunities for construction equipment operators, contact a local of the International Union of Operating Engineers; a local apprenticeship committee; or the nearest office of the State apprenticeship agency. In addition, the local office of the State employment service may provide information about apprenticeship and other training programs.

For general information about the work of construction equipment operators, contact:

- Associated Builders and Contractors, 729 15th St. NW., Washington, DC 20005.
- Associated General Contractors of America, Inc., 1957 E St. NW., Washington, DC 20006.
- International Union of Operating Engineers, 1125 17th St. NW., Washington, DC 20036.

Information on industrial truck and tractor operators is available from:

- Industrial Truck Association, 1750 K St. NW., Suite 210, Washington, DC 20006.

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## Rail Transportation Workers

(D.O.T. 198; 850.663-018; 910.137-022, .362, .363, .364, .367-010, -022, .382, .583, .664, .667-026, .683-010, -014, -022; 913.463-014; .919.663-014, .683-018, -026; 932.664-010)

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### Nature of the Work

Rail transportation workers facilitate the movement of passengers and cargo by our Nation's trains, subways, and streetcars.

**Railroad transportation workers.** Locomotive engineers and rail yard engineers are among the most highly skilled workers on the railroad. These engineers operate locomotives in yards, stations, and on the road between stations. Locomotive engineers transport cargo and passengers between stations, while rail yard engineers move cars

within yards to assemble or disassemble trains. In addition to those engineers who work for railroads, some engineers called dinkey operators work at industrial sites or mines operating engines that help transport coal, rock, or supplies.

Engineers operate the throttle to start and accelerate the train and use airbrakes or dynamic brakes to slow and stop it. They monitor gauges and meters that measure speed, fuel, temperature, battery charge, and air pressure in the brake lines. Both on the road and in the yard, they watch for signals that indicate track obstructions, other train movements, and speed limits. They must have a thorough knowledge of the signal systems, yards, and terminals along their route and be constantly aware of the condition and makeup of the train. This is extremely important because trains react differently to acceleration, braking, and curves, depending on the number of cars, the ratio of empty to loaded cars, and the amount of slack in the train.

Most engineers run diesel locomotives; a few run electric locomotives. Before and after each run, engineers check locomotives for mechanical problems. Minor adjustments are made on the spot, but major defects are reported to the engine shop supervisor. In an effort to reduce costs, most railroads are phasing out assistant engineers, also known as firers, who monitor locomotive instruments and signals and observe the track for obstructions. Most of these duties are now performed by brake operators.

Road conductors and yard conductors are in charge of train and yard crews. Conductors assigned to freight trains keep records of each car's contents and destination and make sure that cars are added and removed at the proper points along the route. Conductors assigned to passenger trains collect tickets and fares and assist passengers. At stops, they signal engineers when to pull out of the station.

Before a train leaves the terminal, the conductor receives instructions on the train's route, timetable, and cargo from the dispatcher and discusses these with the engineer. On many trains, conductors receive additional information by radio while underway. This may include information about track conditions ahead or instructions to pull off at the next available stop to let another train pass. During the run, conductors use two-way radios to contact engineers. They pass on instructions received from dispatchers and remind engineers of stops, reported track conditions, and the presence of other trains.

Conductors regularly receive information from brake operators regarding needed repairs while underway or the removal of defective cars at the nearest station or stop. They inform dispatchers of any problems using a radio or wayside telephone.

Yard conductors supervise the crews that assemble and disassemble trains. Some cars are sent to special tracks for unloading, while the rest are moved to other tracks to await being made into trains destined for different cities. Conductors tell engineers where to move cars and tell brake operators which cars to couple and uncouple and which switches to throw to divert the locomotive or cars to the proper track. In yards that have automatic classification systems, conductors use electrical controls to operate the track switches that route cars to the correct track.

Brake operators play a pivotal role in making locomotives and cars into trains. Working under the direction of conductors, they do the physical work involved in adding and removing cars at railroad stations and assembling and disassembling trains in railroad yards.

Freight train crews include either one or two brake, signal, and switch operators—one in the locomotive with the engineer and another in the rear car. Many freight trains use only one operator in the locomotive as new visual instrumentation and monitoring devices have eliminated the need for rear brake operators. Before departure, brake operators inspect the train to make sure that all couplers and air hoses are fastened, that handbrakes on all the cars are released, and that the airbrakes are functioning properly. While underway, they regularly look for smoke, sparks, and other signs of sticking brakes, overheated axle bearings, and other faulty equipment. They may make minor repairs to air hoses and couplers. In case of unexpected stops, brake operators set up signals to protect both ends of the train.

When freight trains approach an industrial site, the brake operator in the locomotive gets off the train and runs ahead to switch the train to the proper track. They uncouple the cars and throw track switches

to route them to certain tracks if they are to be unloaded, or to an outgoing train if their final destination is further down the line. They also set hand brakes to secure cars.

Many smaller railroads operate with only two crew members—an engineer and a conductor. Most passenger trains no longer employ brake operators but employ assistant conductors to help conductors collect tickets and assist passengers.

**Subway and streetcar operators.** Subway operators guide subway trains, observing the signal system. They start, slow, or stop the subway on signal. Subway operators make announcements, open and close doors, and ensure that passengers get on and off the subway safely. Operators should have a basic understanding of the operating system and be able to diagnose the causes of minor problems. When emergencies occur, operators contact the appropriate officials and may have to evacuate subway cars. Operators also ensure that subways stay on their predetermined schedules.

Streetcar operators drive electric-powered streetcars to transport passengers, collect fares from passengers, and issue change and transfers. They also answer questions from passengers concerning fares, schedules, and routes.

### Working Conditions

Since most trains operate 24 hours a day, 7 days a week, many rail transportation employees often work nights, weekends, and holidays. Some subway operators work multiple shifts some days. Undesirable shifts are assigned to persons who have the least seniority.

Most freight trains are unscheduled, so few workers on these trains have scheduled assignments. Instead, their names are placed on a list, and when their turn comes they are assigned to the next train, usually on short notice and often at odd hours. Because road service personnel often work on trains that operate between stations that are hundreds of miles apart, they may spend several nights a week away from home.

Freight and yard conductors and brake operators spend most of their time outdoors in all kinds of weather. The work of brake operators on local runs—where trains frequently stop at stations to pick up and deliver cars—is physically demanding. Climbing up and down and getting off moving cars is strenuous and can be dangerous.

### Employment

Rail transportation workers held about 107,000 jobs in 1990—including 35,000 brake operators, 28,000 conductors, 16,000 locomotive engineers, and 8,200 rail yard engineers and dinkey operators. Subway and streetcar operators accounted for about 14,000 jobs; other rail vehicle workers, the remaining 5,600 jobs. Railroads employ about 90 percent of all rail transportation workers. State and local governments and mining and manufacturing establishments that operate their own railroad cars to carry freight employ the remainder.



*Subway and trolley car operators must be alert while at the controls.*

### Training, Other Qualifications, and Advancement

Most railroad transportation workers begin as trainees for either engineer or brake operator jobs. Railroads prefer that applicants have a high school education. Applicants must have good hearing, eyesight, and color vision, as well as good eye-hand coordination, manual dexterity, and mechanical aptitude. Physical stamina is required for brake operator jobs. Most employers require that applicants for railroad transportation jobs pass a physical examination and tests that screen for drug use. Railroads prefer that applicants for engineering jobs be at least 21 years old. Engineering jobs are frequently filled by experienced railroad operating workers such as brake operators or conductors.

Most beginning engineers undergo a 6-month training program. These programs include classroom and on-the-job instruction in locomotive operation. At the end of the training period, aspiring engineers take qualifying tests covering locomotive equipment, airbrake systems, fuel economy, train handling techniques, and operating rules and regulations.

On most railroads, beginning brake operators make several trips with conductors and experienced operators to become familiar with the job. On some railroads, however, new brake operators undergo extensive training, including instruction in signaling, coupling and uncoupling cars, throwing switches, and boarding moving trains.

As engineers and brake operators are needed, newly trained workers who have the most seniority are placed on the "extra board." Extra board engineers and brake operators substitute for regular workers who are absent because of vacation, illness, or other personal reasons. Extra board engineers and brake operators frequently must wait a number of years before accumulating enough seniority to get a regular assignment. Seniority rules also may determine the type of service. For instance, an engineer may move from an initial regular assignment in yard service to road service.

Engineers must pass periodic physical examinations that determine their fitness to operate locomotives. In some cases, engineers who fail to meet the physical standards are restricted to yard service; in other instances, they may be discharged or trained to perform other work.

Jobs as conductors generally are filled from the ranks of experienced brake operators who have passed tests covering signals, timetables, operating rules, and related subjects. Some companies require that these tests be passed within the first few years of employment. Until permanent positions become available, new conductors are put on the extra board—where they substitute for experienced conductors who are absent. On most railroads, conductors on the extra board may work as brake operators if there are not enough conductor runs available for them that month. Seniority usually is the main factor in determining promotion from brake operator to conductor and from the extra board to a permanent position. Advancement to conductor jobs is limited because there are many more brake operators than conductors.

Most railroads maintain separate seniority lists for road service and yard service conductors. Conductors usually remain in one type of service for their entire career. On some railroads, however, conductors start in the yards, then move to freight service, and finally to passenger service. Some conductors advance to managerial or administrative positions.

Subway transit systems prefer applicants with a high school education for subway operator jobs. Some transit systems require subway operators to work as busdrivers for a specified period of time. Applicants must be in good health, articulate, and able to make quick, responsible judgments.

New operators generally are placed in classroom and on-the-job training programs that last from a few weeks to 6 months. At the end of the training period, most operators must pass qualifying examinations covering the operating system, troubleshooting, and evacuation and emergency procedures. Some operators with sufficient seniority can advance to station managers.

### Job Outlook

Little change is expected in the overall employment of rail transportation workers through the year 2005, reflecting the continuing decline in railroad employment. This decline stems in part from

decreasing demand for railroad freight and passenger services primarily due to increasing competition from other modes of transportation such as trucking, shipping, and airlines. While railroad operating costs were rising—resulting in increased costs to users—operating costs of competing modes of transportation were falling. As a result, businesses increasingly used other means of transportation to carry their goods.

The decline in the number of railroad transportation workers has also resulted from innovations such as larger, faster, more fuel-efficient trains and computerized classification yards that make it possible to move passengers and freight more economically. Computers are used to keep track of freight cars, match empty cars with the closest loads, and dispatch trains. Also, computer-assisted devices alert engineers to train malfunctions, eliminating the need for brake operators in the rear car. Employment is expected to continue to decline due to these innovations and new work rules that allow trains to operate with two- or three-person crews instead of the traditional five-person crews formerly required.

Job opportunities for railroad transportation workers will be severely limited. Many positions will not be filled as people leave the occupation or will be filled by persons already employed in the industry. Employment opportunities for locomotive and yard engineers, although limited, should be slightly better than other rail occupations because they should be less affected than other workers by technological changes and reductions in crew size. On the other hand, employment of brake operators should be the most adversely affected as visual instrumentation and monitoring devices have eliminated the need for rear brake operators.

While railroads have faced tremendous problems, intracity rail systems have grown rapidly as more cities have built new subway systems and have added new lines to existing systems. This trend is expected to continue. As a result, employment of subway operators is expected to grow much faster than the average for all occupations. Because subway operator is a well-paying occupation with limited educational requirements, however, many applicants can expect to face considerable competition for available positions.

### Earnings

Earnings of railroad transportation workers depend on the size of the train and type of service. According to union data, annual earnings of yard engineers averaged about \$42,000 in 1990. Locomotive engineers in both passenger service and freight service averaged \$55,000. Conductors in passenger service averaged about \$48,000 a year, while those in freight service averaged \$55,800. Brake operators averaged about \$46,000 in freight service and \$36,000 in yard service.

Based on limited information, annual earnings of subway operators ranged from \$27,000 to \$33,500 in 1990.

Most rail transportation employees in yards work 40 hours a week and receive extra pay for overtime. Most railroad workers in road service are paid according to miles traveled or hours worked, whichever leads to higher earnings. Full-time employees have steadier work, more regular hours, and higher earnings than those assigned to the extra board.

There are many railroad unions representing various crafts on the railroads. However, most railroad engineers are members of the Brotherhood of Locomotive Engineers, while most other railroad transportation workers are members of the United Transportation Union. Many subway operators are members of the Amalgamated Transit Union, while others belong to the Transport Workers Union of North America.

### Sources of Additional Information

Information on employment opportunities for railroad transportation workers may be obtained from the employment offices of the various railroads. A list of the main offices for the major railroads may be obtained from:

Association of American Railroads, 50 F St. NW, Washington, DC 20001.

For additional information on employment opportunities in rail transportation, contact local offices of rail transit systems and the State employment service.

## Timber Cutting and Logging Workers

(D.O.T. 454 except .134; 455 except .134; 459.387, .687; 669.687-022; 921.364, .664-014, .667-014, .687-014, -030; 922.687-082; 929.683-010)

Each year, thousands of acres of the Nation's forests are harvested for timber that provides the raw material for countless consumer and industrial products. The timber cutting and logging process is carried out by a variety of workers.

Fallers cut down trees with chain saws or mechanical felling equipment. Buckers trim off the tops and branches and buck (cut) the resulting logs into specified lengths. These workers usually use gas-powered chain saws.

Choker setters fasten chokers (steel cables or chains) around logs to be skidded (dragged) by tractors or forwarded by the cable yarding system to the landing. A cable yarding system consists of one or more towers (either mobile cranes or fixed steel towers) interconnected by cables and fixed to the ground by guy wires and tree stumps. The logs are attached to the cables, which are reeled on and off drums by machines called yarders, and then forwarded from the felling site to the landing. Riggers set up and dismantle the cables and guy wires of the cable yarding system.

Logging tractor operators drive crawler or wheeled tractors to skid logs from the felling site to the landing. Some operate harvestors—tractors outfitted with specialized equipment that can cut and delimb trees. Others operate forwarders that haul the logs to the landing and load them onto trucks.

Log handling equipment operators operate tracked or wheeled equipment to load or unload logs and pulpwood onto or off trucks or gondola railroad cars.

Log graders and scalers inspect logs for defects, measure logs to determine their volume, and estimate the marketable content or value of logs or pulpwood.

Other timber cutting and logging workers have a variety of responsibilities. Cruisers hike through forests to assess logging conditions and estimate the volume of marketable timber. Brush clearing laborers clear areas of brush and other growth to prepare for logging activities and to promote growth of desirable species of trees. Tree trimmers prune tree tops and branches, using saws or pruning shears. Pickers select and place logs onto skidders and log blocks onto conveyors to be sent to other machines for further processing. Log markers determine the bucking points at which logs will be sawn into sections. Rivers use sledge hammers, mallets, wedges, and froes (cleaving tools) to split logs to form posts, pickets, shakes, and other objects. Rigging slingers determine the sequence of logs to be yarded by the cable yarding system. Chasers direct the placement of logs at landings and disengage their chokers. Pulp pilers stack pulpwood logs at landings near logging roads.

Although timber cutting and logging equipment has been greatly improved and operations are becoming increasingly mechanized, many logging jobs are still labor intensive. These jobs require various levels of skill, ranging from manually moving logs, branches, and equipment to skillfully using chain saws, peavies (hooked poles), and log jacks to cut and position logs for further processing or loading. Skillful operation of vehicles and equipment is necessary to avoid accidents and to minimize damage to the equipment and environment. The knowledge to maintain and repair equipment is increasingly necessary to reduce costs and increase productivity. A skillful, experienced logger is expected to handle a variety of logging operations.

Weather can force curtailment of logging operations during the muddy spring season, dry summer periods, and cold winter months. Changes in the level of construction, particularly residential, also affect logging activities. In addition, logging operations must be relocated when timber harvesting in a particular area has been completed. During prolonged periods of inactivity, some workers may stay on the job to maintain or repair logging machinery and equipment; others are forced to find jobs in other occupations or be without work.

The timber cutting and logging industry is characterized by a large number of small crews of four or fewer workers—primarily fallers, buckers, choker setters, and others whose jobs are labor intensive. Most of these crews work for self-employed logging contractors who possess substantial logging experience, the capital to purchase equipment, and the skills needed to run a small business successfully. Most contractors work alongside their crews as working supervisors. Many manage more than one crew and function as owner-supervisors. Crews may work directly or on a contractual basis for large logging companies, sawmills, or forest product companies. They may travel throughout several States working at various sites.

### Working Conditions

Most timber cutting and logging jobs involve lifting, climbing, and other strenuous activities. A few lumber camps, primarily in Alaska and Maine, house workers in bunkhouses or company towns. Workers in sparsely populated Western States daily commute long distances between their homes and logging sites. In the densely populated Eastern States, commuting distances are much shorter.

Loggers work outdoors under unusually hazardous conditions. Falling trees and branches are a constant menace, as are the dangers associated with log handling operations and use of sawing equipment, especially delimiting devices. Strong winds require special care and can even halt operations. Slippery or muddy ground and hidden roots or vines not only reduce efficiency but present a constant danger, especially in the presence of moving vehicles and machinery. Poisonous plants and brambles are minor annoyances. Over long periods of time, if safety precautions are not taken, hearing may be impaired by the high noise level of sawing and skidding operations. Experience, exercise of caution, and use of proper safety measures and equip-

ment—such as hardhats, eye and hearing protection equipment, and safety clothing and boots—are extremely important to avoid injury.

### Employment

Timber cutting and logging workers held about 108,000 jobs in 1990, distributed among the following occupations:

Fallers and buckers .....	36,000
Logging tractor operators .....	29,000
Log handling equipment operators.....	16,000
All other timber cutting and related logging occupations ....	27,000

Most salaried timber cutting and logging workers are employed in the logging camps and logging contractors industry. Others work in the sawmills and planing mills and arborist services industries. Although logging operations are found in most States, Oregon and Washington account for about 1 out of every 4 logging workers.

Self-employed logging contractors account for 3 out of every 10 logging workers—a much higher proportion of self-employment than for most occupations.

While seasonal demand for logging workers varies slightly by region, employment generally is highest in the summer and lowest in the winter.

### Training, Other Qualifications, and Advancement

Most timber cutting and logging workers develop their skills through on-the-job training. They must familiarize themselves with the character and potential dangers of the forest environment and the operation of logging machinery and equipment. Instruction comes primarily from experienced workers. However, larger logging companies and trade associations such as the Northeastern Loggers Association may offer special programs, particularly for workers training to operate large, expensive machinery and equipment. Often, a representative of the manufacturer or company may spend several days in the field explaining and overseeing the operation of newly purchased machinery. Safety training is a vital part of instruction for all logging workers.

Experience in other occupations can expedite entry into various logging occupations. For example, woodworkers such as carpenters and sawyers can become buckers. Equipment operators such as truck-drivers and bulldozer and crane operators can assume skidding and yarding functions. Some loggers have worked in sawmills or on family farms with extensive wooded areas. Some logging contractors were formerly crew members of family-owned businesses operated over several generations.

Generally, little formal education is required. However, many secondary schools, including vocational and technical schools, and a few community colleges offer courses in general forestry and forest harvesting. Courses in basic mathematics are recommended. A curriculum that includes field trips to observe or participate in logging activities provides a particularly good background.

Timber cutting and logging workers must have good health, physical strength and stamina, and the desire and ability to work outdoors every day under difficult conditions. The ability to work as part of a team is vital. Maturity and good judgment are important in making quick, intelligent decisions in dealing with hazards as they arise. Mechanical aptitude and coordination are necessary qualities for operators of machinery and equipment, who often are responsible for repair and maintenance as well. Initiative and managerial and business skills are necessary for success as a self-employed logging contractor.

Timber cutting and logging workers generally advance from occupations involving primarily manual labor to those involving the operation of expensive, sometimes complicated machinery and equipment. Inexperienced entrants begin as laborers, carrying tools and equipment, clearing brush, and loading and unloading logs and brush. For some, familiarization with logging operations may lead to jobs such as choker setter and log handling equipment operator. Further experience may lead to jobs involving the operation of more complicated machinery and yarding towers to transport, load, and unload logs. Those who have the motor skills required for the efficient use of power saws and other equipment may become fallers and buckers. Some logging workers who can readily assess the marketable volume of timber or identify defects in logs may become cruisers and graders.



Skilled loggers are expected to perform varied tasks.

## Job Outlook

Overall employment of timber cutting and logging workers is expected to show little or no change through the year 2005. Despite an increase in demand for lumber and wood products, increased mechanization of logging operations and improvements in logging equipment will restrain employment growth. In addition, forest conservation efforts may restrict the volume of public timber available for harvesting, further dampening demand for timber cutting and logging workers. Despite the lack of job growth, many job openings are expected each year to replace workers who transfer to other jobs—often less physically demanding and dangerous—or leave the labor force.

Increasing mechanization will have differing effects on timber cutting and logging workers. Employment of fallers, buckers, choke setters, and other workers whose jobs are labor intensive should decline as safer, laborsaving machinery and equipment are increasingly used. Employment of machinery and equipment operators, such as logging tractor and log handling equipment operators, should be less adversely affected.

Many logging workers experience periods of unemployment because of weather conditions, declines in construction activity, and relocation of logging operations.

## Earnings

In 1990, average annual earnings of full-time logging workers were \$15,900. Generally, earnings of more skilled workers, such as fallers and yarder operators, are substantially higher than those of less skilled workers, such as laborers and choker setters.

Earnings vary widely by size of establishment and geographic area. Earnings of workers in the largest establishments are much higher than those in the smallest establishments. Workers in Alaska and the Northwest earn substantially more than those in the South.

Small logging contractors generally offer timber cutting and logging workers few fringe benefits. However, some employers offer full-time workers basic fringe benefits such as medical coverage and provide safety apparel and equipment.

Many logging workers in the Northwest, where the larger establishments are concentrated, are members of either one of two unions—the International Woodworkers of America or the Western Council of Industrial Workers.

## Related Occupations

Other occupations concerned with the care of trees and their environment include arborist, forest technician, forest worker, forester aide, gardener, groundskeeper, landscaper, nursery worker, range aide, soil conservation technician, and tree-farm worker.

## Sources of Additional Information

For information about timber cutting and logging careers and secondary and postsecondary programs offering training for logging occupations, contact:

- Northeastern Loggers Association, P.O. Box 69, Old Forge, NY 13420.
- Timber Producers Association of Michigan and Wisconsin, P.O. Box 39, Tomahawk, WI 54487.
- Pacific Logging Congress, 4494 River Rd. North, Salem, OR 97303.

The school of forestry at your State land-grant college or university should also be able to provide useful information.

Residents of Southern States may also contact their State forestry associations. Addresses are available in public libraries.

plane. But truckdrivers usually make the initial pickup from factories, consolidate cargo at terminals for intercity shipment, and deliver goods from terminals to stores and homes.

Before leaving the terminal or warehouse, truckdrivers check their trucks for fuel and oil. They also inspect the trucks they will drive to make sure the brakes, windshield wipers, and lights are working and see that a fire extinguisher, flares, and other safety equipment are aboard and in working order. Drivers adjust mirrors so that both sides of the truck are visible from the driver's seat, and make sure the cargo has been loaded properly so it will not shift during the trip. Drivers report to the dispatcher any equipment that does not work, or is missing, or cargo that is not loaded properly.

Once underway, drivers must be alert to prevent accidents and to drive their trucks efficiently. Because drivers of large tractor-trailers sit higher than cars, pickups, and vans, they can see far down the road. They seek traffic lanes that allow them to move at a steady speed, and, when going downhill, they may increase speed slightly to gain momentum for a hill ahead.

Long-distance runs vary widely. On short "turnarounds," truckdrivers deliver a load to a nearby city, pick up another loaded trailer, and drive it back to their home base the same day. Other runs take an entire day, and drivers remain away from home overnight. On longer runs, drivers may haul loads from city to city for a week or more before returning home. Some companies use two drivers on very long runs. One drives while the other sleeps in a berth behind the cab. "Sleeper" runs may last for days, or even weeks, usually with the truck stopping only for fuel, food, loading, and unloading.

Some long-distance drivers who have regular runs transport freight to the same city on a regular basis. Because shippers request varying amounts of service to different cities every day, many drivers have unscheduled runs. Dispatchers tell these drivers when to report for work and where to haul the freight.

After long-distance truckdrivers reach their destination, or at the end of their operating shift, they complete reports about the trip and the condition of the truck, as required by the U.S. Department of Transportation. They must give a detailed report of any accident.

Long-distance truckdrivers spend most of their working time behind the wheel but may be required to unload their cargo. Drivers hauling some specialty cargo often load or unload their trucks, since they may be the only one at the destination familiar with this procedure. Auto-transport drivers, for example, drive and position the cars on the trailers and head ramps and remove them at the final destination. When picking up or delivering furniture, drivers of long-distance moving vans hire local workers to help them load or unload.

When local truckdrivers receive assignments from the dispatcher to make deliveries, pickups, or both, they also get delivery forms. Before the drivers arrive for work, material handlers generally have loaded the trucks and arranged the items in order of delivery to minimize handling of the merchandise.

At the customer's place of business, local truckdrivers generally load or unload the merchandise. If there are heavy loads or many deliveries to make during the day, drivers may have helpers. Customers must sign receipts for goods and drivers may receive money for material delivered. At the end of the day, they turn in receipts, money, and records of deliveries made and report any mechanical problems they have discovered with their trucks.

The work of local truckdrivers varies, depending on the product they transport. Produce truckers usually pick up a loaded truck in the early morning and spend the rest of the day delivering produce to many different grocery stores. Lumber truckdrivers, on the other hand, make several trips from the lumber yard to one or more construction sites. Gasoline tank truckdrivers attach the hoses and operate the pumps on their trucks to transfer the gasoline to gas stations' storage tanks.

Some local truckdrivers have sales and customer relations responsibilities. These drivers—called driver-sales workers or route drivers—are primarily responsible for delivering their firm's products, but they also represent the company. Their reaction to customer complaints and requests for special services can make the difference between a larger order and losing a customer. Route drivers also may use their selling ability to increase sales and to gain additional customers.

## Truckdrivers

(D.O.T. 292.353, .363, .463, .483, and .667; 900.683 through 905.683; 906; 909.663; 919.663-018, -022, -026; and 953.583)

### Nature of the Work

Nearly all goods are transported by truck during some of their journey from producers to consumers. Goods may also be shipped between terminals or warehouses in different cities by train, ship, or

The duties of driver-sales workers vary according to the industry in which they are employed, the policies of their particular company, and how strongly their sales responsibilities are emphasized. Most have wholesale routes—that is, they deliver to businesses and stores rather than homes. A few deliver various foods to homes, or pick up and deliver drycleaning, but retail routes are now rare.

Wholesale bakery driver-sales workers, for example, deliver and arrange bread, cakes, rolls, and other baked goods on display racks in grocery stores. Paying close attention to the items that are selling well and those just sitting on the shelves, they estimate the amount and variety of baked goods that will be sold. They may recommend changes in a store's order or may encourage the manager to stock new bakery products. From time to time, they try to get the business of new stores along their route.

Driver-sales workers employed by laundries that rent linens, towels, work clothes, and other items visit businesses regularly to replace soiled laundry.

Vending machine driver-sales workers service machines in factories, schools, and other buildings. They check items remaining in the machines, replace stock, and remove money deposited in the cash boxes. They also examine each vending machine to see that merchandise and change are dispensed properly, make minor repairs, and clean machines.

After completing their route, driver-sales workers order items for the next day which they think customers are likely to buy, based primarily on what products have been selling well, the weather, time of year, and any discussion they may have had with customers.

### **Working Conditions**

Truckdriving has become less physically demanding because most trucks now have more comfortable seats, better ventilation, and improved cab designs. However, driving for many hours at a stretch, unloading cargo, and making many deliveries can be tiring, and driving in bad weather, heavy traffic, or mountains can be nerve racking. Local truckdrivers, unlike long-distance drivers, usually can return home in the evening. Some self-employed long distance truckdrivers who own as well as operate their trucks spend over 240 days a year away from home.

Local truckdrivers frequently work 48 hours or more a week. Many who handle food for chain grocery stores, produce markets, or bakeries drive at night or early in the morning. Although most drivers have a regular route, some have different routes each day. Many local truck-

drivers—particularly driver-sales workers—load and unload their own trucks, which require considerable lifting, carrying, and walking.

The U.S. Department of Transportation governs work hours and other matters of trucking companies engaged in interstate commerce. For example, a long-distance driver cannot be on duty for more than 60 hours in any 7-day period and cannot drive more than 10 hours following at least 8 consecutive hours off duty. Many drivers, particularly on long runs, work close to the maximum hours permitted. Drivers on long runs may face boredom, loneliness, and fatigue. Although many drivers work during the day, travel at night and on holidays and weekends is frequently necessary in order to avoid traffic delays and deliver cargo on time.

### **Employment**

Truckdrivers held over 2.7 million jobs in 1990. Jobs are concentrated in and around large cities. Some drivers are employed in almost all communities, however.

Trucking companies employed nearly one-third of all truckdrivers, and another one-third worked for companies engaged in wholesale or retail trade, such as auto parts stores, oil companies, lumber yards, or distributors of food and grocery products. The rest were scattered throughout the economy, including government agencies.

Fewer than 1 out of 10 truckdrivers is self-employed; of these, a significant number are owner-operators, who either operate independently, serving a variety of businesses, or lease their services and their trucks to a trucking company.

### **Training, Other Qualifications, and Advancement**

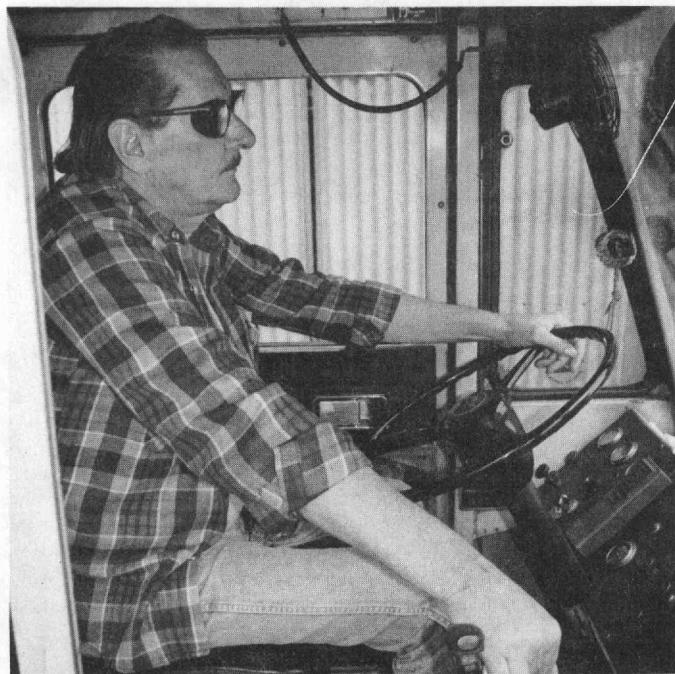
Qualifications and standards for truckdrivers are established by State and Federal regulations. States must meet Federal standards, and some States have more stringent regulations. All truckdrivers must have a driver's license issued by the State in which they live, and most employers strongly prefer a good driving record. All drivers of trucks designed to carry at least 26,000 pounds—which includes most tractor-trailers as well as bigger straight trucks—are required to obtain a special Commercial Driver's License (CDL) from the State in which they live; a regular driver's license is sufficient for driving light trucks and vans in many States. All truckdrivers who operate trucks that carry hazardous materials also must obtain a CDL.

To qualify for a Commercial Driver's License, applicants must pass a knowledge test and demonstrate that they can operate a commercial truck safely. A national data bank permanently records all driving violations incurred by persons who hold commercial licenses, so drivers whose commercial license is suspended or revoked in one State may not be issued a new one in another State. Trainees must be accompanied by a driver with a CDL until they get their own CDL. Information on how to apply for a Commercial Driver's License can be obtained from State motor vehicle administrations.

The U.S. Department of Transportation establishes minimum qualifications for truckdrivers who are engaged in interstate commerce. A driver must be at least 21 years old and pass a physical examination, which the employer usually pays for. Good hearing, 20/40 vision with or without glasses or corrective lenses, normal use of arms and legs (unless a waiver is obtained), and normal blood pressure are the main physical requirements. Persons with epilepsy or diabetes controlled by insulin are prohibited, and drivers may not use any controlled substances unless prescribed by a licensed physician. In addition, drivers must take a written examination on the Motor Carrier Safety Regulations of the U.S. Department of Transportation.

Many trucking operations have higher standards than those described. Many firms require that drivers be at least 25 years old, be able to lift heavy objects, and have driven trucks for 3 to 5 years. Many prefer to hire high school graduates and require annual physical examinations. Increasingly, employers are requiring that drivers submit to periodic drug screening as a condition of employment.

Since drivers often deal directly with the company's customers, they must get along well with people. For jobs as driver-sales workers, an ability to speak well and a neat appearance are particularly important, as are self-confidence, initiative, and tact. For all truck-driver jobs, employers also look for responsible, self-motivated individuals, since drivers work with little supervision.



Truckdrivers spend most of their time behind the wheel.

Driver-training courses are a desirable method of preparing for truckdriving jobs and obtaining a Commercial Driver's License. High school driver-training courses are an asset, and courses in automotive mechanics may help drivers make minor roadside repairs. Many private and public technical-vocational schools offer tractor-trailer driver training programs. Students learn to inspect the trucks and freight, to drive large vehicles on crowded streets and in highway traffic, and to comply with Federal, State, and local regulations. However, some programs provide only a limited amount of actual driving experience, and completion of a program does not assure a job. Persons interested in attending one of these schools should check with local trucking companies to make sure the school's training is acceptable to them or seek a school certified by the Professional Truck Driver Institute as providing training that meets Federal Highway Administration guidelines for training tractor-trailer drivers.

Training given to new drivers by employers usually is informal and may consist only of a few hours of instruction from an experienced driver, sometimes on the new employee's own time. New drivers also may ride with and observe experienced drivers before being assigned their own runs. Additional training may be given if they are to drive a special type of truck. Some companies give 1 to 2 days of classroom instruction which covers general duties, the operation and loading of a truck, company policies, and the preparation of delivery forms and company records. Driver-sales workers also receive training on the various types of products they carry so they will be more effective sales workers and better able to handle customer requests.

Very few people enter truckdriving directly from school; most truckdrivers previously held jobs in other occupations. Consideration is given to driving experience in the Armed Forces. In some instances, a person also may start as a truckdriver's helper, driving part of the day and helping to unload and load freight. When driving vacancies occur, senior helpers usually are promoted.

New drivers sometimes start on panel or other small "straight" trucks. As they gain experience and show good driving skills, they may advance to larger and heavier trucks, and finally to tractor-trailers.

Although most new truckdrivers are assigned immediately to regular driving jobs, some start as extra drivers, who substitute for regular drivers who are ill or on vacation. They receive a regular assignment when an opening occurs.

Advancement of truckdrivers is generally limited to driving runs that provide increased earnings or preferred schedules and working conditions. For the most part, a local truckdriver may advance to driving heavy or special types of trucks, or transfer to long-distance truckdriving. Working for companies that also employ long-distance drivers is the best way to advance to these positions. A few truckdrivers may advance to dispatcher, to manager, or to traffic work—for example, planning delivery schedules.

Some long-distance truckers purchase a truck and go into business for themselves. Although many of these owner-operators are successful, others fail to cover expenses and eventually lose their trucks. Owner-operators should have good business sense as well as truckdriving experience. Courses in accounting, business, and business arithmetic are helpful, and knowledge of truck mechanics can enable owner-operators to perform their own routine maintenance and minor repairs.

## Job Outlook

Employment of truckdrivers is expected to increase about as fast as the average for all occupations through the year 2005 as the economy grows and the amount of freight carried by trucks increases. Average growth of local and long-distance truckdriver employment should outweigh the slow growth in driver-sales worker jobs. The number of truckdrivers with sales responsibilities is expected to increase slowly because companies are increasingly splitting their responsibilities among other workers, shifting sales, ordering, and customer service tasks to sales and office staffs, and using regular truckdrivers to make deliveries to customers.

Opportunities should be favorable for persons who are interested in entering truckdriving. This occupation has among the largest number of job openings each year. Although thousands of openings will be created by growth in demand for drivers, the majority will occur as

experienced drivers transfer to other fields of work or retire or leave the labor force for other reasons. However, truckdriver jobs vary greatly in terms of earnings, weekly work hours, number of nights that must be spent "on the road," and the quality of equipment operated. Since truckdriving does not require education beyond high school, competition is expected for jobs with the most attractive earnings and working conditions.

Job opportunities may vary from year to year because the amount of freight moved by trucks fluctuates with the economy. Many new truckdrivers are hired when the economy and the volume of freight are expanding, but fewer when these decline. During economic slowdowns, some truckdrivers are laid off and others have decreased earnings because of reduced hours or miles driven. Independent owner-operators are particularly vulnerable to slowdowns. Truckdrivers employed in industries such as wholesale food distribution, which is usually not affected much by recessions, are less likely to be laid off.

## Earnings

As a rule, local truckdrivers are paid by the hour and receive extra pay for working overtime, usually after 40 hours. Long-distance drivers are generally paid primarily by the mile, and their rate per mile can vary greatly from employer to employer; their earnings increase with mileage driven, seniority, and the size and type of truck. Most driver-sales workers receive a commission based on their sales, in addition to an hourly wage.

In 1990, truckdrivers had average straight-time hourly earnings of \$12.06. Depending on the size of the truck, average hourly earnings were as follows:

Tractor-trailers .....	\$13.00
Medium trucks .....	12.98
Heavy straight trucks .....	11.25
Light trucks .....	7.97

Drivers employed by trucking companies had the highest earnings, averaging about \$13.60 an hour in 1990. Truckdrivers in the Northeast and West had the highest earnings; those in the South had the lowest.

Most long-distance truckdrivers operate tractor-trailers, and their earnings vary widely, from as little as \$20,000 to over \$40,000 annually. Most self-employed truckdrivers are primarily engaged in long-distance hauling, and earnings of \$20,000 to \$25,000 a year are common, after deducting their living expenses and the costs associated with operating their trucks.

Many truckdrivers are members of the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America. Some truckdrivers employed by companies outside the trucking industry are members of unions that represent the plant workers of the companies for which they work.

## Related Occupations

Other driving occupations include ambulance driver, busdriver, chauffeur, and taxi driver.

## Sources of Additional Information

Information on truckdriver employment opportunities is available from local trucking companies and local offices of the State employment service.

Information on career opportunities in truckdriving may be obtained from:

- American Trucking Associations, Inc., 2200 Mill Rd., Alexandria, VA 22314.

The Professional Truck Driver Institute of America, a nonprofit organization established by the trucking industry, manufacturers and others, certifies truckdriver training programs that meet industry standards. The Institute has available for \$4 *A Checklist For Quality Programs in Tractor Trailer Driver Training*, a do-it-yourself guide for evaluating the quality of a truckdriver training program. This publication, as well as a free list of certified tractor-trailer driver training programs, may be obtained from:

- Professional Truck Driver Institute of America, 8788 Elk Grove Blvd., Suite M, Elk Grove, CA 95624.

## Water Transportation Occupations

(D.O.T 197.130-010, .133 except -010 and -018, .137-010, .161-010, .163-010, -014, -018, .167 except -014; 911.131-010, .133-010, .137-010, -014, .263-010, .363-010, -014, .364-010, .584-010, .664-010, -014, .687-022 and -030; 951.685-018)

### Nature of the Work

Workers in water transportation occupations operate and maintain deep sea merchant ships, tugboats, towboats, ferries, dredges, research vessels, and other waterborne craft on the oceans and the Great Lakes, in harbors, on rivers and canals, and on other waterways. (Fishers, who are described elsewhere in the *Handbook*, also operate water vessels in the course of their work.)

*Captains or masters* supervise the operation of a vessel and the work of the other officers and the crew. They set course and speed, maneuver to avoid hazards and other ships, and determine their position, using navigation aids, celestial observations, and charts. They signal or command crew members to steer the vessel, operate engines, signal to other vessels, attach lines, or operate towing or dredging gear. They insure that proper procedures and safety practices are being followed, check that machinery and equipment are in good working order, and oversee the loading and unloading of cargo or passengers. They also maintain logs and other records of ships' movements and cargo carried.

On large vessels, captains are assisted by deck officers or mates. Merchant marine vessels—those carrying cargo overseas—have a chief or first mate, a second mate, and a third mate. Mates stand watch for specified periods, usually 4 hours on and 8 off, overseeing the operation of the vessel. On smaller vessels, there may be only one mate (called a pilot on some inland vessels) who alternates watches with the captain.

*Engineers or marine engineers* operate, maintain, and repair propulsion engines, boilers, generators, pumps, and other machinery. Merchant marine vessels usually have four engineering officers: A chief engineer and a first, second, and third assistant engineer. Assistant engineers stand periodic watches, overseeing the operation of engines and machinery.

*Seamen*, also called *deckhands*, particularly on inland waters, help navigate the vessel, operate deck equipment, and keep the nonengineering areas in good condition. They stand watch, looking out for other vessels, obstructions in the ship's path, and aids to navigation. They also measure water depth in shallow water, steer the ship, and maintain and operate deck equipment such as life boats, anchors, and cargo-handling gear. When docking or departing, they handle lines. They also perform maintenance chores such as repairing lines, chipping rust, and painting and cleaning decks and other areas. Seamen may also load and unload cargo. On vessels handling liquid cargo, they hook up hoses, operate pumps, and clean tanks. Deckhands on tugboats or tow vessels tie barges together into tow units, inspect them periodically, and break them apart when the destination is reached. They also handle lines when maneuvering large oceangoing vessels. Larger vessels have a *boatswain* or head seaman. *Marine oilers* lubricate gears, shafts, bearings, and other moving parts of engines and motors, read pressure and temperature gauges and record data, and may repair and adjust machinery.

A typical deep sea merchant ship has a captain, three deck officers or mates, a chief engineer and three assistant engineers, plus six or more seamen and oilers. Depending on their size, vessels operating in harbors, rivers, or along the coast may have a crew comprising only a captain and one deckhand, or as many as a captain, a mate or pilot, an engineer, and seven or eight seamen. Large vessels also have a full-time cook and helper, while on small ones, a seaman does the cooking. Merchant mariners also have an electrician, machinery mechanics, and a radio officer.

Pilots guide ships in and out of harbors, through straits, and on rivers and other confined waterways where a familiarity with local winds, tides, currents, and hazards such as reefs and shoals is of prime importance. Pilots on river and canal vessels usually are regu-

lar crew members, like mates. Harbor pilots are generally independent contractors, who are assigned to vessels entering or leaving port. They may pilot many ships in a single day.

### Working Conditions

Merchant mariners are away from home for extended periods, but earn long leaves. Most are hired for one voyage, with no job security after that. At sea, they usually stand watch for 4 hours and are off for 8 hours, 7 days a week. Those employed on Great Lakes ships work 60 days and have 30 days off, but do not work in the winter when the lakes are frozen over. Workers on rivers and canals and in harbors are more likely to have year-round work. Some work 8- or 12-hour shifts and go home every day. Others work steadily for a week or month and then have an extended period off. When working, they are usually on duty for 6 or 12 hours and are off for 6 or 12 hours.

People in water transportation occupations work in all weather conditions and face injury or death from fire, collision, sinking, or falling overboard, or working with machinery, heavy loads, and dangerous cargo. Newer vessels are air-conditioned, soundproofed from noisy machinery, and have comfortable living quarters. Nevertheless, some find the long periods away from home and the confinement aboard ship difficult.

### Employment

Water transportation workers held about 48,000 jobs in 1990. Many merchant marine officers and seamen worked only part of the year, so the total number who worked some time during the year was somewhat greater. The following tabulation shows employment in the occupations that make up this group:

Seamen and marine oilers.....	22,000
Captains and pilots .....	14,000
Mates .....	6,800
Engineers .....	6,500

A few of the captains and pilots were self-employed, operating their own vessel, or were pilots who were independent contractors.

About 40 percent of all water transportation workers were employed on board merchant marine ships or U.S. Navy Military Sealift ships operating on the oceans or Great Lakes. Another 40 percent were employed in transportation services, working on tugs, towboats, ferries, dredges, and other watercraft in harbors, on rivers and canals, and other waterways. Others worked in water transportation services such as piloting vessels in and out of harbors, operating lighters and chartered boats, and in marine construction, salvaging, and surveying. The remaining water transportation workers were employed on vessels that carry passengers, such as cruise ships, sightseeing and excursion boats, and ferries.

### Training and Other Qualifications

Entry, training, and educational requirements for most water transportation occupations are established and regulated by the U.S.



Seamen help navigate the vessel.

Coast Guard, but differ somewhat between the merchant marine and others.

Deck and engineering officers in the merchant marine must be licensed. To qualify for a license, applicants must have graduated from the U.S. Merchant Marine Academy, or one of the six State academies, and pass a written examination. Persons with at least 3 years of appropriate sea experience also can be licensed if they pass the exam, but it is difficult to pass without substantial formal schooling or independent study. Also, since seamen may work 6 months a year or less, it can take 5 to 8 years to accumulate the necessary experience. The academies offer 4-year bachelor's degree programs (one offers a 3-year associate program) in nautical science or marine engineering to prepare students to be third mates or third assistant engineers. With experience and passing of additional exams, third officers may qualify for higher rank. Because of keen competition, however, officers may have to take jobs below the grade they are qualified for.

For employment in the merchant marine as an unlicensed seaman, a merchant mariner's document is needed. Applicants must be U.S. citizens, have a medical certificate of excellent health, and a U.S. Public Health Service certificate attesting to vision, color perception, and general physical condition. While no experience or formal schooling is required, training at a union-operated school is helpful. Beginners are classified as ordinary seaman and may be assigned to the deck or engineering department. With experience at sea, and perhaps union-sponsored training, an ordinary seaman can pass the able seaman exam.

Merchant marine officers and seamen (experienced and beginners) are hired for voyages through union hiring halls or directly by shipping companies.

Harbor pilot training is usually an apprenticeship with a shipping company or a pilot employees' association. Entrants may be able seamen or licensed officers.

No training or experience is needed to become a seaman or deckhand on vessels operating in harbors or on rivers or other waterways. Newly hired workers generally learn skills on the job. With experience, they are eligible to take a Coast Guard exam to qualify as a mate, pilot, or captain. Substantial knowledge gained through experience, courses in seamanship schools, and independent study are needed to pass the exam.

#### **Job Outlook**

Overall, employment in water transportation occupations is projected to decline through the year 2005, but will vary by sector.

Employment in deep sea shipping is expected to continue its long-term sharp decline as U.S.-manned ships carry an even smaller proportion of international cargo. (In 1989, only 4.3 percent of our imports and exports were carried on U.S.-manned ships.) Only new Federal legislation and subsidies would stop the decline, and these are not likely.

The decline in jobs has created competition for jobs, with many experienced merchant mariners going for long periods without work.

As a result, unions generally accept few new members. Also, many merchant marine academy graduates have not found licensed shipboard jobs in the U.S. merchant marine, although most do find related jobs. All are commissioned as ensigns in the U.S. Naval Reserve, and many go on active duty in the Navy. Some find jobs on tugboats or other watercraft or on foreign-flag vessels, or take jobs as seamen on U.S. flag ships. Some take land-based jobs with shipping companies, marine insurance companies, manufacturers of boilers or related machinery, civilian jobs with the U.S. Navy, or other related jobs. Unless the number of people seeking merchant marine jobs declines sharply, the present keen competition is likely to continue.

Vessels on rivers and canals and on the Great Lakes carry bulk products such as coal, ore, petroleum, sand and gravel, grain, and chemicals. Shipments of these products are expected to grow through the year 2005, but productivity increases should cause employment to decline. Employment in water transportation services is likely to show little or no change.

#### **Earnings**

Water transportation workers who usually worked full time had median weekly earnings of \$550 in 1990. The middle 50 percent earned between \$430 and \$760 a week. The lowest 10 percent earned less than \$280, while the highest 10 percent earned more than \$1,020 a week.

Captains and mates had median weekly earnings of \$600 a week in 1990. The middle 50 percent earned between \$500 and \$800 a week. The lowest paid 10 percent earned less than \$335, while the highest more than \$1,245 a week.

Seamen and marine oilers had median weekly earnings of \$530 a week in 1990. The middle 50 percent earned between \$325 and \$790 a week. The lowest 10 percent earned less than \$240 a week, while the highest 10 percent earned more than \$1,080 a week.

#### **Related Occupations**

Workers in occupations having duties and responsibilities similar to these occupations include fishing vessel captains, ferryboat operators, and hatchtenders.

#### **Sources of Additional Information**

Information on merchant marine careers, training, and licensing requirements is available from:

- ☛ Maritime Administration, U.S. Department of Transportation, 400 7th St. SW., Washington, DC 20590.
- ☛ U.S. Coast Guard, Licensing and Evaluation Branch, Merchant Vessel and Personnel Division, 2100 2nd St. SW., Washington, DC 20593.

Individuals interested in attending a merchant marine academy should contact:

- ☛ Admissions Office, U.S. Merchant Marine Academy, Kings Point, NY 11024.
- ☛ California Maritime Academy, P.O. Box 1392, Vallejo, CA 94590.

# Related Publications

## Occupational Projections and Training Data

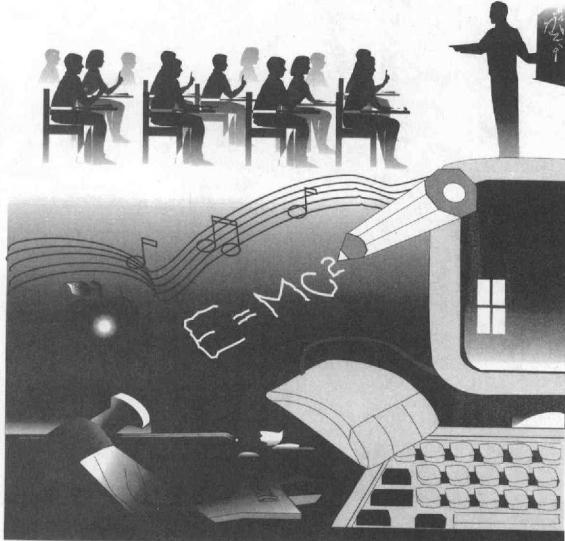
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A Statistical and Research Supplement  
to the 1990-93 Occupational Outlook Handbook

U.S. Department of Labor  
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April 1992

Bulletin 2401

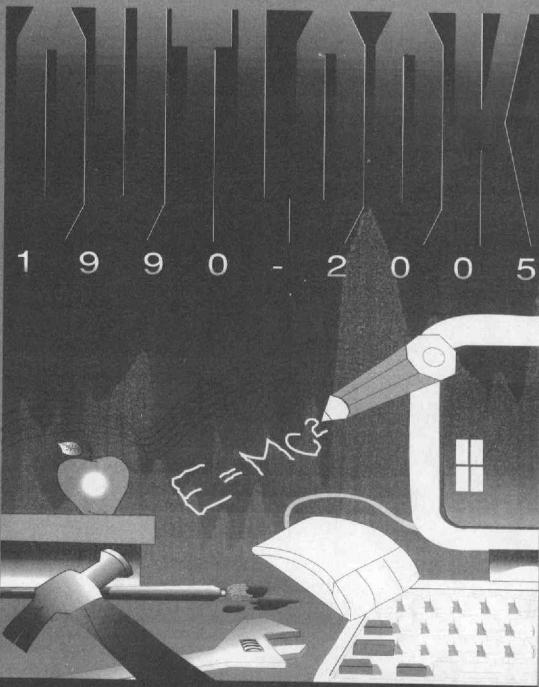


BLS Bulletin 2401

## Occupational Projections and Training Data, 1992 Edition

This supplement to the *Occupational Outlook Handbook* provides the statistical and technical data supporting the information presented in the *Handbook*. Education and training planners, career counselors, and jobseekers can find valuable information that ranks occupations by employment growth, earnings, susceptibility to unemployment, separation rates, and part-time work.

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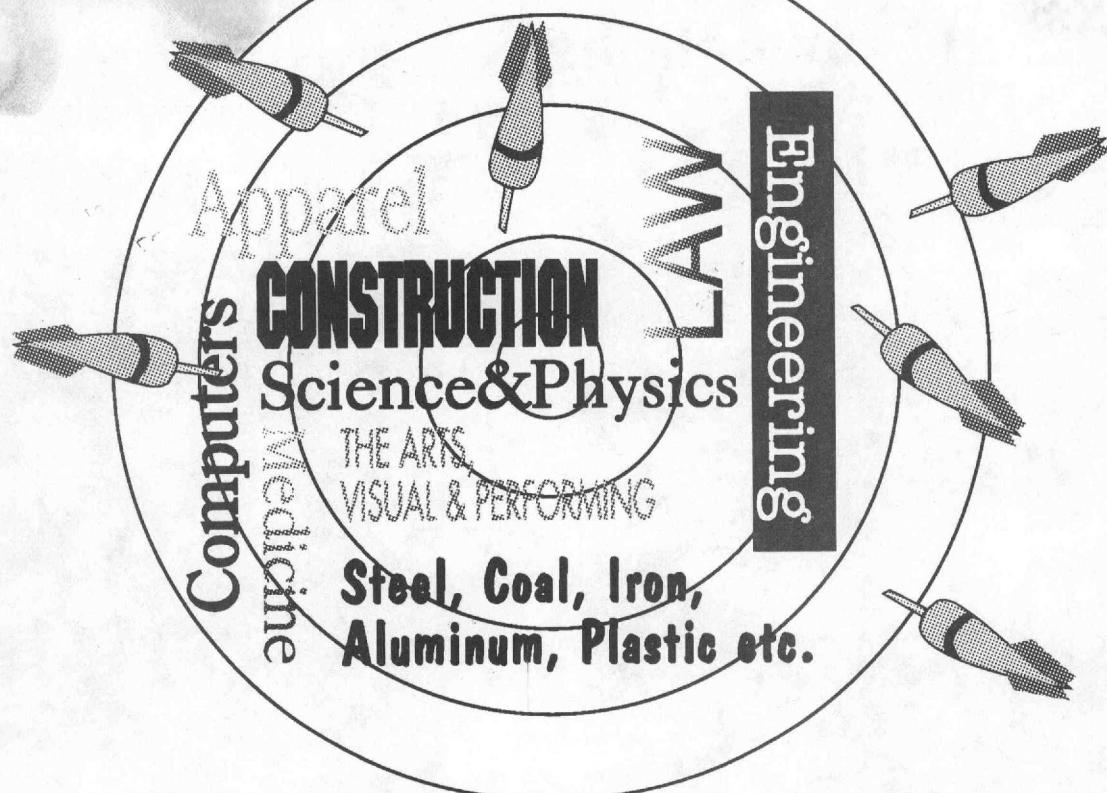
## Outlook 1990-2005

Every 2 years, the Bureau of Labor Statistics produces detailed projections of the U.S. economy and labor force. This bulletin presents the Bureau's latest analyses of economic and industrial growth, the labor force, and trends in occupational employment into the 21st century. An overview article focuses on important issues raised by these projections.

### Note:

At press time, prices for these publications were not available. For prices and ordering information, contact any of the Bureau of Labor Statistics Regional Offices listed on the inside of the front cover, or the Division of Occupational Outlook, Bureau of Labor Statistics, Washington, DC 20212.

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**Note:** At press time, the price for this publication was not available. Contact any of the Bureau of Labor Statistics Regional Offices listed on the inside front cover, or the Division of Occupational Outlook, Bureau of Labor Statistics, Washington, DC 20212.