

# VEHICLE OPERATION



JOB	HOW MANY PPL DO THIS?	JOB DESCRIPTION	WORK ENVIRONMENT	TRAINING NEEDED	PAY	JOB OUTLOOK
<b>Heavy Tractor-trailer &amp; Truck Drivers</b>	1,797,700	Heavy and tractor-trailer truck drivers transport goods from one location to another. Most tractor-trailer drivers are long-haul drivers and operate trucks with a gross vehicle weight (GVW) capacity—that is, the combined weight of the vehicle, passengers, and cargo—exceeding 26,000 pounds. These drivers deliver goods over intercity routes, sometimes spanning several states.	Working as a long-haul truck driver is a major lifestyle choice because these drivers can be away from home for days or weeks at a time.	Heavy and tractor-trailer truck drivers usually have a high school diploma and attend a professional truck driving school. They must have a commercial driver’s license (CDL).	The median annual wage for heavy and tractor-trailer truck drivers was \$40,260 in May 2015.	Employment of heavy and tractor-trailer truck drivers is projected to grow 5 percent from 2014 to 2024, about as fast as the average of all occupations. As the economy grows, the demand for goods will increase and more truck drivers will be needed to keep supply chains moving.
<b>Bus Drivers</b>	665,000	Bus drivers transport people between various places—including work, school, and shopping malls—and across state or national borders. Some drive regular routes, and others transport passengers on chartered trips or sightseeing tours.	Bus drivers, especially transit and intercity bus drivers, had a higher rate of work-related injuries and illnesses in 2014 than the national average. Most injuries to bus drivers were due to highway accidents.	Bus drivers must have a commercial driver’s license (CDL). This can sometimes be earned during on-the-job training. A bus driver must possess a clean driving record and often may be required to pass a background check. They also must meet physical, hearing and vision requirements. In addition, bus drivers often need a high school diploma or the equivalent.	The median annual wage for bus drivers was \$30,950 in May 2015.	Employment of bus drivers is projected to grow 6 percent from 2014 to 2024, about as fast as the average for all occupations. Job opportunities for bus drivers should be favorable, especially for school bus drivers, as many drivers are expected to leave the occupation.

<p><b>Taxi Drivers &amp; Chauffeurs</b></p>	<p>233,700</p>	<p>Taxi drivers and chauffeurs drive people to and from the places they need to go, such as airports, homes, shopping centers, and workplaces. They must know their way around a city to take passengers to their destinations.</p>	<p>About 1 in 5 taxi drivers and chauffeurs worked part time in 2014. Evening and weekend work is common.</p>	<p>Most taxi drivers and chauffeurs go through a brief training period. Many states and local municipalities require them to get a taxi or limousine license. Although a high school diploma is not required, many taxi drivers and chauffeurs have one.</p>	<p>The median annual wage for taxi drivers and chauffeurs was \$23,510 in May 2015.</p>	<p>Employment of taxi drivers and chauffeurs is projected to grow 13 percent from 2014 to 2024, faster than the average for all occupations. An increase in ride-hailing services, that utilize electronic hailing through smartphone apps, should contribute to employment growth.</p>
<p><b>Material-Moving Machine Operators</b></p>	<p>679,900</p>	<p>Material moving machine operators use machinery to transport various objects. Some operators move construction materials around building sites or excavate earth from a mine. Others move goods around a warehouse or onto container ships.</p>	<p>Most material moving machine operators work full time, and overtime for them is common. Because materials are shipped around the clock, some operators—especially those in warehousing—work overnight shifts.</p>	<p>Education and training requirements vary by occupation. Crane operators and excavating machine operators usually have several years of experience in related occupations.</p>	<p>The median annual wage for material moving machine operators was \$33,640 in May 2015.</p>	<p>Employment of material moving machine operators is projected to grow 3 percent from 2014 to 2024, slower than the average for all occupations. Job openings should result from the need to replace workers who leave these occupations.</p>
<p><b>Railroad Workers</b></p>	<p>113,300</p>	<p>Workers in railroad occupations ensure that passenger and freight trains run on time and travel safely. Some workers drive trains, some coordinate the activities of the trains, and others operate signals and switches in the rail yard.</p>	<p>Nearly all locomotive engineers; conductors and yardmasters; and brake, signal, and switch operators work in the rail transportation industry. Rail yard engineers work in rail transportation and also support activities for rail.</p>	<p>Railroad workers generally require a high school diploma and several months of on-the-job training.</p>	<p>The median annual wage for railroad workers was \$55,180 in May 2015.</p>	<p>Employment of railroad workers is projected to decline 3 percent from 2014 to 2024. Although demand for rail transportation may grow, an increase in productivity may hold back employment growth in rail occupations.</p>
<p><b>Airline and Commercial Pilots</b></p>	<p>119,200</p>	<p>Airline and commercial pilots fly and navigate airplanes, helicopters, and other aircraft. Airline pilots fly for airlines that transport people and cargo on a fixed schedule. Commercial pilots fly aircraft for other purposes, such as charter flights, rescue operations, firefighting, aerial photography, and aerial application, also known as crop dusting.</p>	<p>Pilots work primarily in aircraft. They may spend a considerable amount of time away from home because of overnight layovers. Many pilots have variable schedules.</p>	<p>Most airline pilots begin their careers as commercial pilots. Commercial pilots typically need a high school diploma or equivalent. Airline pilots typically need a bachelor's degree. All pilots who are paid to fly must have at least a commercial pilot's license from the Federal Aviation Administration (FAA). In addition, airline pilots must have the Airline</p>	<p>The median annual wage for airline and commercial pilots was \$102,520 in May 2015.</p>	<p>Employment of airline and commercial pilots is projected to grow 5 percent from 2014 to 2024, about as fast as the average for all occupations. Low-cost regional airlines and nonscheduled aviation services will provide the most job opportunities. Pilots seeking jobs at the major airlines will face strong competition.</p>

				Transport Pilot (ATP) certificate. Pilots may need to achieve an instrument rating and other ratings.		
<b>Water Transportation Workers</b>	78,500	Water transportation workers operate and maintain vessels that take cargo and people over water. The vessels travel to and from foreign ports across the ocean and to domestic ports along the coasts, across the Great Lakes, and along the country's many inland waterways.	Water transportation workers usually work for long periods and can be exposed to all kinds of weather.	Education and training requirements vary by the type of job. There are no educational requirements for entry-level sailors and oilers, but officers and engineers usually must have an endorsement certificate from the U.S. Coast Guard. Most water transportation jobs require the Transportation Worker Identification Credential (TWIC) from the Transportation Security Administration and a Merchant Marine Credential (MMC).	The median annual wage for water transportation workers was \$55,000 in May 2015.	Employment of water transportation workers is projected to grow 9 percent from 2014 to 2024, faster than the average for all occupations. The growing demand for bulk commodities such as iron ore, grain, and petroleum should increase the need for these workers.
<b>Subway and streetcar operators</b>	12,000	Operate subway or elevated suburban trains with no separate locomotive, or electric-powered streetcar, to transport passengers. May handle fares.	Often work in an enclosed vehicle or equipment.	High school diploma or equivalent. Moderate-term on-the-job training.	May 2015 median annual wage: \$62,360	5% Growth projected 2014-24

# PASSENGER ASSISTANCE

**GARRETT A. MORGAN**  
TECHNOLOGY AND TRANSPORTATION  
EDUCATION PROGRAM CLEARINGHOUSE



JOB	HOW MANY PPL DO THIS?	JOB DESCRIPTION	WORK ENVIRONMENT	TRAINING NEEDED	PAY	JOB OUTLOOK
<b>Travel Agents</b>	74,100	Travel agents sell transportation, lodging, and entertainment activities to individuals and groups planning trips. They offer advice on destinations, plan trip itineraries, and make travel arrangements for clients.	Travel agents typically work in offices, but some work remotely because much of their time is spent on the phone and the computer. Most travel agents work for travel agencies, although about 1 in 10 were self-employed in 2014.	A high school diploma typically is required for someone to become a travel agent. However, many employers prefer additional formal training as well. Good communication and computer skills are essential.	The median annual wage for travel agents was \$35,660 in May 2015.	Employment of travel agents is projected to decline 12 percent from 2014 to 2024. The ability of travelers to use the Internet to research vacations and book their own trips is expected to continue to suppress demand for travel agents. Job prospects should be best for travel agents who specialize in specific destinations or particular types of travelers.
<b>Flight Attendants</b>	97,900	Flight attendants provide routine services and respond to emergencies to ensure the safety and comfort of airline passengers.	Flight attendants work evenings, weekends, and holidays, because airlines operate every day and have overnight flights. Attendants work in aircraft and may be away from home several nights per week. Most have variable schedules.	Flight attendants receive initial training from their employer and must be certified by the Federal Aviation Administration (FAA). Although flight attendants must have at least a high school diploma or the equivalent, some airlines prefer to hire applicants who have taken some college courses. Prospective flight attendants typically need previous work experience in customer service. Applicants must be at least 18 years old, be eligible to work in the United States, have a valid passport, and pass a background check and drug test.	The median annual wage for flight attendants was \$44,860 in May 2015.	Employment of flight attendants is projected to grow 2 percent from 2014 to 2024, slower than the average for all occupations. Job prospects should be best for applicants with a college degree.
<b>Transportation Attendants (General)</b>	16,500	Provide services to ensure the safety and comfort of passengers aboard ships, buses, trains, or within the station or terminal. Perform duties such as greeting passengers, explaining the use of safety equipment, serving meals or beverages, or answering questions related to travel. Excludes "Baggage Porters and Bellhops".	Requirements for success include dealing positively with disgruntled customers.	These occupations usually require a high school diploma. Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.	May 2015 median annual wage: \$25,930	6% Growth projected 2014-24

# VEHICLE ASSEMBLY & MAINTENANCE



JOB TITLE	HOW MANY PPL DO THIS?	JOB DESCRIPTION	WORK ENVIRONMENT	TRAINING NEEDED	PAY	JOB OUTLOOK
<b>Assemblers &amp; Fabricators</b>	1,834,000	Assemblers and fabricators assemble finished products and the parts that go into them. They use tools, machines, and their hands to make engines, computers, aircraft, ships, boats, toys, electronic devices, control panels, and more.	Most assemblers and fabricators work in manufacturing plants. Some of the work may involve long periods of standing or sitting. Most work full time, and they sometimes work evenings and weekends.	The education level and qualifications needed to enter these jobs vary depending on the industry and employer. Although a high school diploma is enough for most jobs, experience and additional training is needed for more advanced assembly work.	The median annual wage for assemblers and fabricators was \$30,080 in May 2015.	Employment of assemblers and fabricators is projected to show little or no change from 2014 to 2024. Qualified applicants, including those with technical vocational training and certification, should have the best job opportunities in the manufacturing sector, particularly in growing, high-technology industries, such as aerospace and electro-medical devices.
<b>Automotive Service Technicians and Mechanics</b>	739,900	Automotive service technicians and mechanics, often called service technicians or service techs, inspect, maintain, and repair cars and light trucks.	Most automotive service technicians and mechanics work in well-ventilated and well-lit repair shops. Although technicians often identify and fix automotive problems with computers, they commonly work with greasy parts and tools, sometimes in uncomfortable positions.	Employers prefer that automotive service technicians and mechanics complete a formal education program at a postsecondary institution. Industry certification is usually required once the person is employed.	The median annual wage for automotive service technicians and mechanics was \$37,850 in May 2015.	Employment of automotive service technicians and mechanics is projected to grow 5 percent from 2014 to 2024, about as fast as the average for all occupations. Job opportunities for qualified jobseekers should be good.
<b>Diesel Mechanics</b>	263,900	Diesel service technicians and mechanics inspect, repair, and overhaul buses and trucks, or maintain and repair any type of diesel engine.	Diesel service technicians and mechanics usually work in well-ventilated and sometimes noisy repair shops. They occasionally repair vehicles on roadsides or at worksites. Most diesel technicians work full time, and overtime and evening shifts are common.	Most diesel service technicians and mechanics learn informally on the job after a high school education, but employers increasingly prefer applicants who have completed postsecondary training programs in diesel engine repair. Although not required, industry certification can be important for diesel technicians.	The median annual wage for diesel service technicians and mechanics was \$44,520 in May 2015.	Employment of diesel service technicians and mechanics is projected to grow 12 percent from 2014 to 2024, faster than the average for all occupations. Job opportunities should be best for those who have completed postsecondary training in diesel engine repair.

<b>Aircraft and Avionics Equipment Mechanics and Technicians</b>	137,300	Aircraft and avionics equipment mechanics and technicians repair and perform scheduled maintenance on aircraft. They also may perform aircraft inspections as required by the Federal Aviation Administration (FAA).	Aircraft and avionics equipment mechanics and technicians work in hangars, in repair stations, or on airfields. They often must meet strict deadlines to maintain flight schedules. The environment can be loud because of aircraft engines and equipment. Workers frequently bend, stoop, and reach from ladders and scaffolds. Most mechanics and technicians work full time; overtime and weekend work is common.	Many aircraft and avionics equipment mechanics and technicians learn their trade at an FAA-approved aviation maintenance technician school. Others enter with a high school education or equivalent and are trained on the job. Some workers enter the occupation after receiving training in the military. Although not required, aircraft mechanics and avionics technicians typically become licensed or certified.	The median annual wage for aircraft and avionics equipment mechanics and technicians was \$58,390 in May 2015.	Employment of aircraft and avionics equipment mechanics and technicians is projected to show little or no change from 2014 to 2024. Job prospects will be best for mechanics who hold an Airframe and Power plant (A&P) certificate.
<b>Marine Engineers and Naval Architects</b>	8,300	Marine engineers and naval architects design, build, and maintain ships from aircraft carriers to submarines, from sailboats to tankers. Marine engineers are primarily responsible for the internal systems of a ship, such as propulsion, electrical, refrigeration, and steering. Naval architects are primarily responsible for the ship design, including the form, structure, and stability of hulls.	Marine engineers and naval architects held about 8,300 jobs in 2014. They typically work in offices, where they have access to computer software and other tools necessary for analyzing projects and designing solutions. Sometimes, they must go to sea on ships to test or maintain the ships that they have designed or built.	Marine engineers typically need a bachelor's degree in marine engineering, marine systems engineering, or marine engineering technology, and naval architects typically need a bachelor's degree in naval architecture. Employers also value practical experience, so cooperative education programs, which provide college credit for structured job experience, are valuable.	The median annual wage for marine engineers and naval architects was \$93,110 in May 2015.	Employment of marine engineers and naval architects is projected to grow 9 percent from 2014 to 2024, faster than the average for all occupations. The need to design environmentally-friendly ships and systems to transport energy products, such as liquefied natural gas, across the globe will help to spur employment growth for this occupation.
<b>Automotive and watercraft service attendants</b>	105,800	Service automobiles, buses, trucks, boats, and other automotive or marine vehicles with fuel, lubricants, and accessories. Collect payment for services and supplies. May lubricate vehicle, change motor oil, install antifreeze, or replace lights or other accessories, such as windshield wiper blades or	People working in these roles are most often working outdoors as well as working with others.	No formal educational credential. Short-term on-the-job training.	May 2015 median annual wage: \$21,560	11% Growth projected 2014-24

		fan belts. May repair or replace tires.				
<b>Automotive Body and Glass Repairers</b>	169,100	Automotive body and glass repairers restore, refinish, and replace vehicle bodies and frames, windshields, and window glass.	Automotive body repairers work indoors in body shops, which are often noisy. Most shops are well ventilated, so that dust and paint fumes can be dispersed. They sometimes work in awkward and cramped positions, and their work can be physically demanding. Automotive glass installers and repairers often travel to the customer's location to repair damaged windshields and window glass.	Most employers prefer to hire automotive body and glass repairers who have completed a formal training program in automotive body or glass repair. Still, many new automotive body and glass repairers begin work without formal training. Industry certification is becoming increasingly important.	The median annual wage for automotive body and glass repairers was \$39,880 in May 2015.	Employment of automotive body and glass repairers is projected to grow 9 percent from 2014 to 2024, faster than the average for all occupations. Job opportunities should be very good for jobseekers with industry certification and formal training in automotive body and glass repair.
<b>Industrial Production Managers</b>	173,400	Industrial production managers oversee the daily operations of manufacturing and related plants. They coordinate, plan, and direct the activities used to create a wide range of goods, such as cars, computer equipment, or paper products.	Most industrial production managers work full time, and almost half worked more than 40 hours per week in 2014.	Industrial production managers typically need a bachelor's degree and several years of related work experience.	The median annual wage for industrial production managers was \$93,940 in May 2015.	Employment of industrial production managers is projected to decline 4 percent from 2014 to 2024. Most of these managers are employed in various manufacturing industries, and may experience growth or decline along with the industries in which they are employed.
<b>Small Engine Mechanics</b>	71,700	Small engine mechanics inspect, service, and repair motorized power equipment. Mechanics often specialize in one type of equipment, such as motorcycles, motorboats, or outdoor power equipment.	Small engine mechanics generally work in well-ventilated but noisy repair shops. They sometimes make onsite repair calls, which may require working in poor weather conditions. Although most work full time, seasonal work hours often fluctuate. Workers are often busiest during the spring and summer, when equipment use is the highest.	Small engine mechanics typically enter the occupation with a high school diploma or postsecondary nondegree award and learn their trade through on-the-job training. As motorized power equipment becomes more sophisticated, employers increasingly prefer to hire mechanics who have completed postsecondary education programs.	The median annual wage for small engine mechanics was \$34,650 in May 2015.	Employment of small engine mechanics is projected to grow 4 percent from 2014 to 2024, slower than the average for all occupations. Those with formal training should have better job opportunities.

<p><b>Heavy Vehicle and Mobile Equipment Service Technicians</b></p>	<p>186,500</p>	<p>Heavy vehicle and mobile equipment service technicians inspect, maintain, and repair vehicles and machinery used in construction, farming, rail transportation, and other industries.</p>	<p>Service technicians usually work indoors in noisy repair shops. They often lift heavy parts and tools, handle greasy and dirty equipment, and stand or lie in uncomfortable positions. Most service technicians work full time, and many work evenings and weekends.</p>	<p>Most heavy vehicle and mobile equipment service technicians have a high school diploma or equivalent. Because vehicle and equipment technology is increasingly sophisticated and computerized, some employers prefer to hire service technicians who have completed a formal training program at a postsecondary institution.</p>	<p>The median annual wage for heavy vehicle and mobile equipment service technicians was \$47,120 in May 2015.</p>	<p>Employment of heavy vehicle and mobile equipment service technicians is projected to grow 5 percent from 2014 to 2024, about as fast as the average for all occupations. Job opportunities for qualified jobseekers should be good.</p>
--	----------------	--	---	--	--	--



# PLANNING, ENGINEERING & CONSTRUCTION

**GARRETT A. MORGAN**  
TECHNOLOGY AND TRANSPORTATION  
EDUCATION PROGRAM CLEARINGHOUSE



JOB	HOW MANY PPL DO THIS?	JOB DESCRIPTION	WORK ENVIRONMENT	TRAINING NEEDED	PAY	JOB OUTLOOK
<b>Urban &amp; Regional Planners</b>	38,000	Urban and regional planners develop land use plans and programs that help create communities, accommodate population growth, and revitalize physical facilities in towns, cities, counties, and metropolitan areas.	About 2 out of 3 urban and regional planners worked in local government in 2014. They often attend meetings with neighborhood groups that take place during evenings and weekends. Most work full time.	Urban and regional planners need a master's degree from an accredited planning program to qualify for most positions.	The median annual wage for urban and regional planners was \$68,220 in May 2015.	Employment of urban and regional planners is projected to grow 6 percent from 2014 to 2024, about as fast as the average for all occupations. Population growth, economic conditions, and environmental concerns will drive employment growth for planners.
<b>Civil Engineers</b>	281,400	Civil engineers design, build, supervise, operate, and maintain construction projects and systems in the public and private sector, including roads, buildings, airports, tunnels, dams, bridges, and systems for water supply and sewage treatment.	Civil engineers generally work in a variety of locations and conditions. Many spend time outdoors at construction sites so that they can monitor operations or solve problems onsite. Most work full time.	Civil engineers need a bachelor's degree in civil engineering, in one of its specialties, or in civil engineering technology. They typically need a graduate degree and licensure for promotion to senior positions. Although licensure requirements vary within the United States, civil engineers usually must be licensed in the locations where they provide services directly to the public.	The median annual wage for civil engineers was \$82,220 in May 2015.	Employment of civil engineers is projected to grow 8 percent from 2014 to 2024, about as fast as the average for all occupations. As infrastructure continues to age, civil engineers will be needed to manage projects to rebuild bridges, repair roads, and upgrade levees and dams as well as airports and building structures of all types.
<b>Mechanical Engineers</b>	277,500	Mechanical engineering is one of the broadest engineering disciplines. Mechanical engineers design, develop, build, and test mechanical and thermal sensors and devices, including tools, engines, and machines.	Mechanical engineers generally work in offices. They may occasionally visit worksites where a problem or piece of equipment needs their personal attention. Mechanical engineers work mostly in engineering services, research and development, and manufacturing.	Mechanical engineers typically need a bachelor's degree in mechanical engineering or mechanical engineering technology. All states and the District of Columbia require mechanical engineers who sell services to the public to be licensed.	The median annual wage for mechanical engineers was \$83,590 in May 2015.	Employment of mechanical engineers is projected to grow 5 percent from 2014 to 2024, about as fast as the average for all occupations. Job prospects may be best for those who stay abreast of the most recent advances in technology.
<b>Engineering Technicians</b>	70,750	Positions vary depending on which branch of engineering.	Positions vary depending on what branch of engineering is chosen. Branches include civil, electronic, industrial, and chemical engineering.	Training from a technical institute, junior or community college, vocational-technical school, or military training program is desirable.	The mean annual wage is \$61,260.	Outlook varies depending on the type of engineering. For example, for 2014-24, mechanical engineering technicians are expected to grow slower than average at 2% while environmental engineering technicians are expected to grow faster than average at 10%.
<b>Logisticians</b>	130,400	Logisticians analyze and coordinate an organization's supply chain—the system that moves a product from supplier to consumer. They manage the entire life cycle of a product, which includes how a	Logisticians work in nearly every industry. The job can be stressful because logistical work is fast-paced. Most logisticians work full time during regular business hours.	A bachelor's degree is typically required for most positions, although an associate's degree may be sufficient for some logisticians jobs.	The median annual wage for logisticians was \$74,260 in May 2015.	Employment of logisticians is projected to grow 2 percent from 2014 to 2024, slower than the average for all occupations. Employment growth will be driven by the need for logistics in the transportation of goods in a global economy. Growth will be moderated, however, because this occupation is

		product is acquired, distributed, allocated, and delivered.				concentrated in government and manufacturing, both of which are projected to decline.
<b>Construction Laborers and Helpers</b>	1,386,400	Construction laborers and helpers perform many tasks that require physical labor on construction sites.	A variety of work in the construction trades is available, including jobs for paving, surfacing, and tamping equipment operators; pipe-layers and pipe-laying fitters; highway maintenance workers; and mining, quarrying, and tunneling workers.	Construction laborers and helpers learn their trade through on-the-job training. Formal education is not typically required.	Median earnings for handlers, equipment cleaners, helpers, and laborers were about \$xxx a week in xxxx. Construction craft laborers usually earn more.	Employment of construction laborers and helpers is projected to grow 13 percent from 2014 to 2024, faster than the average for all occupations. Laborers and helpers work in all fields of construction, and demand for these workers will mirror the level of overall construction activity.
<b>Cartographers and Photogrammetrists</b>	12,300	Cartographers and photogrammetrists collect, measure, and interpret geographic information in order to create and update maps and charts for regional planning, education, and other purposes. Cartographers are mapmakers who design user-friendly maps. Photogrammetrists are specialized mapmakers who use aerial photographs, satellite images, and light-imaging detection and ranging (LIDAR) technology to build models of the Earth's surface and its features for the purpose of creating maps.	Although cartographers and photogrammetrists spend much of their time in offices, certain jobs require extensive fieldwork to acquire data and verify results. For example, cartographers may travel to the physical locations that they are mapping to better understand the topography of the region. Similarly, photogrammetrists may do fieldwork to plan ground control for an aerial survey and to validate interpretations.	A bachelor's degree in cartography, geography, geomatics, surveying, or a related field is the most common path of entry into this occupation. Some states require cartographers and photogrammetrists to be licensed as surveyors, and some states have specific licenses for photogrammetrists.	2015 Median Pay was \$61,880 per year.	Employment of cartographers and photogrammetrists is projected to grow 29 percent from 2014 to 2024
<b>Surveyors</b>	44,300	Surveyors make precise measurements to determine property boundaries. They provide data relevant to the shape and contour of the Earth's surface for engineering, mapmaking, and construction projects.	Surveying involves both fieldwork and indoor work. When working outside, surveyors may stand for long periods and often walk long distances, sometimes in bad weather. Most work full time.	Surveyors typically need a bachelor's degree. They must be licensed before they can certify legal documents and provide surveying services to the public.	The median annual wage for surveyors was \$58,020 in May 2015.	Employment of surveyors is projected to decline 2 percent from 2014 to 2024. Improvements in surveying technology have increased productivity, reducing demand for surveyors.
<b>Surveying and Mapping Technicians</b>	57,300	Surveying and mapping technicians collect data and make maps of the Earth's surface. Surveying technicians visit sites to take measurements of the land. Mapping technicians use geographic data to create maps. They both assist surveyors, cartographers, and photogrammetrists.	Surveying technicians work outside extensively and can be exposed to all types of weather. Mapping technicians work primarily indoors on computers. Most surveying and mapping technicians work for firms that provide engineering, surveying, and mapping services on a contract basis. Local governments also employ these workers in highway and planning departments.	Surveying technicians usually need a high school diploma. However, mapping technicians often need formal education after high school to study technology applications, such as Geographic Information Systems (GIS).	The median annual wage for surveying and mapping technicians was \$42,010 in May 2015.	Employment of surveying and mapping technicians is projected to decline 8 percent from 2014 to 2024. Advancements in surveying technology have increased productivity, reducing demand for surveying technicians.
<b>Aerospace Engineers</b>	72,500	Aerospace engineers design primarily aircraft, spacecraft, satellites, and missiles. In addition, they test prototypes to make sure that they function according to design.	Aerospace engineers are employed in industries whose workers design or build aircraft, missiles, systems for national defense, or spacecraft. Aerospace engineers are employed primarily in manufacturing, analysis	Aerospace engineers must have a bachelor's degree in aerospace engineering or another field of engineering or science related to aerospace systems. Aerospace engineers that work on projects that	The median annual wage for aerospace engineers was \$107,830 in May 2015.	Employment of aerospace engineers is projected to decline 2 percent from 2014 to 2024. Aircraft are being redesigned to cut down on noise pollution and to raise fuel efficiency, which will help sustain demand for research and development.

			and design, research and development, and the federal government.	are related to national defense may need a security clearance.		
<b>Chemical Engineers</b>	34,300	Chemical engineers apply the principles of chemistry, biology, physics, and math to solve problems that involve the production or use of chemicals, fuel, drugs, food, and many other products. They design processes and equipment for large-scale manufacturing, plan and test production methods and byproducts treatment, and direct facility operations.	Chemical engineers work mostly in offices or laboratories. They may spend time at industrial plants, refineries, and other locations, where they monitor or direct operations or solve onsite problems. Nearly all chemical engineers work full time.	Chemical engineers must have a bachelor's degree in chemical engineering. Employers also value practical experience. Therefore, internships and cooperative engineering programs can be helpful.	The median annual wage for chemical engineers was \$97,360 in May 2015.	Employment of chemical engineers is projected to grow 2 percent from 2014 to 2024, slower than the average for all occupations. Demand for chemical engineers' services depends largely on demand for the products of various manufacturing industries.
<b>Industrial Engineers</b>	241,100	Industrial engineers find ways to eliminate wastefulness in production processes. They devise efficient systems that integrate workers, machines, materials, information, and energy to make a product or provide a service.	Depending on their tasks, industrial engineers work either in offices or in the settings they are trying to improve. For example, when observing problems, they may watch workers assembling parts in a factory. When solving problems, they may be in an office at a computer, looking at data that they or others have collected.	Industrial engineers need a bachelor's degree, typically in industrial engineering. However, many industrial engineers have degrees in mechanical engineering, electrical engineering, manufacturing engineering, industrial engineering technology, or general engineering.	The median annual wage for industrial engineers was \$83,470 in May 2015.	Employment of industrial engineers is projected to show little or no change from 2014 to 2024. Firms in a variety of industries will continue to seek new ways to contain costs and improve efficiency.
<b>Electrical and Electronics Engineers</b>	315,900	Electrical engineers design, develop, test, and supervise the manufacturing of electrical equipment, such as electric motors, radar and navigation systems, communications systems, and power generation equipment. Electronics engineers design and develop electronic equipment, such as broadcast and communications systems—from portable music players to global positioning systems (GPSs).	Electrical and electronics engineers work in industries including research-and development, engineering services, manufacturing, telecommunications, and the federal government. Electrical and electronics engineers generally work indoors in offices. However, they may have to visit sites to observe a problem or a piece of complex equipment.	Electrical and electronics engineers must have a bachelor's degree. Employers also value practical experience, so participation in cooperative engineering programs, in which students earn academic credit for structured work experience.	The median annual wage for electrical and electronics engineers was \$95,230 in May 2015.	Employment of electrical and electronics engineers is projected to show little or no change from 2014 to 2024. Change in employment is expected to be tempered by slow growth or decline in most manufacturing sectors in which electrical and electronics engineers are employed.
<b>Geological &amp; Petroleum Technicians</b>	16,500	Geological and petroleum technicians provide support to scientists and engineers in exploring and extracting natural resources, such as minerals, oil, and natural gas.	Geological and petroleum technicians work in offices, laboratories, and the field. Most geological and petroleum technicians work full time.	Geological and petroleum technicians typically need an associate's degree or 2 years of postsecondary training in applied science or a science-related technology. Some jobs may require a bachelor's degree. Geological and petroleum technicians also receive on-the-job training.	The median annual wage for geological and petroleum technicians was \$55,610 in May 2015.	Employment of geological and petroleum technicians is projected to grow 12 percent from 2014 to 2024, faster than the average for all occupations. Strong demand for natural gas is expected to increase demand for geological exploration and extraction in the future.

# SAFETY & ENVIRONMENT

**GARRETT A. MORGAN**  
TECHNOLOGY AND TRANSPORTATION  
EDUCATION PROGRAM CLEARINGHOUSE



JOB	HOW MANY PPL DO THIS?	JOB DESCRIPTION	WORK ENVIRONMENT	TRAINING NEEDED	PAY	JOB OUTLOOK
<b>Air Traffic Controllers</b>	24,500	Air traffic controllers coordinate the movement of air traffic to ensure that aircraft stay safe distances apart.	Air traffic controllers work in control towers, approach control facilities, or route centers. Their work can be stressful because total concentration is required at all times. Night, weekend, and rotating shifts are common.	A prospective air traffic controller must be a U.S citizen. In addition, the applicant must have a bachelor's degree, or work experience, or a combination of education and experience totaling 3 years. There are medical and background checks to pass, along with exams and a course at the Federal Aviation Administration (FAA) academy.	The median annual wage for air traffic controllers was \$122,950 in May 2015.	Employment of air traffic controllers is projected to decline 9 percent from 2014 to 2024. Most employment opportunities will result from the need to replace workers who retire or leave the occupation.
<b>Environmentalists</b>	94,600	Environmental scientists and specialists use their knowledge of the natural sciences to protect the environment and human health. They may clean up polluted areas, advise policymakers, or work with industry to reduce waste.	Environmental scientists and specialists work in offices and laboratories. Some may spend time in the field gathering data and monitoring environmental conditions firsthand. Most environmental scientists and specialists work full time.	Environmental scientists and specialists need at least a bachelor's degree in a natural science or science-related field for most entry-level jobs.	The median annual wage for environmental scientists and specialists was \$67,460 in May 2015.	Employment of environmental scientists and specialists is projected to grow 11 percent from 2014 to 2024, faster than the average for all occupations. Heightened public interest in the hazards facing the environment, as well as the increasing demands placed on the environment by population growth, is expected to spur demand for environmental scientists and specialists.
<b>Environmental Science and Protection Technicians</b>	36,200	Environmental science and protection technicians monitor the environment and investigate sources of pollution and contamination, including those affecting public health. In addition, they work to ensure that environmental violations are prevented.	Environmental science and protection technicians work in offices, laboratories, and the field.	Environmental science and protection technicians typically need an associate's degree or 2 years of postsecondary education, although some positions may require a bachelor's degree.	The median annual wage for environmental science and protection technicians was \$43,030 in May 2015.	Employment of environmental science and protection technicians is projected to grow 9 percent from 2014 to 2024, faster than the average for all occupations. Environmental science and protection technicians should have good job prospects overall.
<b>Traffic technicians</b>	6,800	Conduct field studies to determine traffic volume, speed, effectiveness of signals, adequacy of lighting, and other factors influencing traffic conditions, under direction of traffic engineer.	People in these positions often work in indoors in office settings.	High school diploma or equivalent. Moderate-term on-the-job training. Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.	May 2015 median annual wage: \$43,930.	6% Growth projected 2014-24

<b>Aviation Inspector</b>	26,400 (Total Transportation Inspector jobs)	Inspect aircraft, maintenance procedures, air navigational aids, air traffic controls, and communications equipment to ensure conformance with Federal safety regulations.	Due to the nature of this work and safety of lives at stake, this can be a high-pressure career.	Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.	May 2015 median annual wage: \$70,820	1% Growth projected 2014-24
<b>Transportation Vehicle, Equipment and Systems Inspectors, Except Aviation</b>	26,400 (Total Transportation Inspector jobs)	Inspect and monitor transportation equipment, vehicles, or systems to ensure compliance with regulations and safety standards.	Work is often completed in an out of an office setting.	These occupations usually require a high school diploma. Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.	May 2015 median annual wage: \$70,820	1% Growth projected 2014-24
<b>Freight and Cargo Inspectors</b>	26,000	Inspect the handling, storage, and stowing of freight and cargoes.	Employees to provide service to others and work with co-workers in a friendly non-competitive environment. Corresponding needs are Co-workers, Moral Values and Social Service.	Most of these occupations require a four-year bachelor's degree. Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.	May 2015 median annual wage: \$70,820	1% Growth projected 2014-24
<b>Recycling Coordinators</b>	173,000 employees	Supervise curbside and drop-off recycling programs for municipal governments or private firms.	Professionals in this role must be self-starters as the work is typically unstructured. Additionally working in this role requires working with a variety of people.	This occupation usually require a high school diploma. Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with this occupation.	May 2015 median annual wage: \$46,960	
<b>Police and Detectives</b>	806,400	Police officers protect lives and property. Detectives and criminal investigators, who are sometimes called agents or special agents, gather facts and collect evidence of possible crimes.	Police and detective work can be physically demanding, stressful, and dangerous. Police officers have one of the highest rates of injuries and illnesses of all occupations. Working around the clock in shifts is common.	Education requirements range from a high school diploma to a college degree. Most police and detectives must graduate from their agency's training academy before completing a period of on-the-job training. Candidates must be U.S. citizens, usually at least 21 years old, and able to meet rigorous physical and personal qualifications.	The median annual wage for police and detectives was \$60,270 in May 2015.	Employment of police and detectives is projected to grow 4 percent from 2014 to 2024, slower than the average for all occupations. The continued desire for public safety is expected to lead to new openings for officers, although demand may vary by location.

# BEHIND THE SCENES

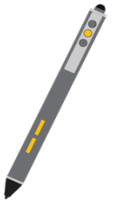


JOB	HOW MANY PPL DO THIS?	JOB DESCRIPTION	TRAINING NEEDED	PAY	JOB GROWTH
<b>Aircraft Cargo Handling</b>	5,800	Supervise and coordinate the activities of ground crew in the loading, unloading, securing, and staging of aircraft cargo or baggage. May determine the quantity and orientation of cargo and compute aircraft center of gravity. May accompany aircraft as member of flight crew and monitor and handle cargo in flight, and assist and brief passengers on safety and emergency procedures. Includes loadmasters.	High school diploma or equivalent	May 2015 median annual wage: \$45,470	0% Growth projected 2014-24
<b>First-line supervisors of helpers, laborers, and material movers, hand</b>	173,100	Directly supervise and coordinate the activities of helpers, laborers, or material movers.	High school diploma or equivalent	May 2015 median annual wage: \$46,960	2% Growth projected 2014-24
<b>First-line supervisors of transportation and material-moving machine and vehicle operators</b>	199,700	Directly supervise and coordinate activities of transportation and material-moving machine and vehicle operators and helpers.	High school diploma or equivalent	May 2015 median annual wage: \$55,860	3% Growth projected 2014-24
<b>Airfield operations specialists</b>	7,200	Ensure the safe takeoff and landing of commercial and military aircraft. Duties include coordination between air-traffic control and maintenance personnel; dispatching; using airfield landing and navigational aids; implementing airfield safety procedures; monitoring and maintaining flight records; and applying knowledge of weather information.	High school diploma or equivalent. On the job training.	May 2015 median annual wage: \$51,880	4% Growth projected 2014-24
<b>Ambulance drivers and attendants, except emergency medical technicians</b>	19,600	Drive ambulance or assist ambulance driver in transporting sick, injured, or convalescent persons. Assist in lifting patients.	High school diploma or equivalent. Moderate on the job training.	May 2015 median annual wage: \$23,740	33% Growth projected 2014-24
<b>Bridge and lock tenders</b>	3,500	Operate and tend bridges, canal locks, and lighthouses to permit marine passage on inland waterways, near shores, and at danger points in waterway passages. May supervise such operations. Includes drawbridge operators, lock operators, and slip bridge operators.	High school diploma or equivalent. Short-term on-the-job training.	May 2015 median annual wage: \$48,520	-1% Growth projected 2014-24
<b>Parking lot attendants</b>	135,600	Park vehicles or issue tickets for customers in a parking lot or garage. May collect fee.	No formal educational credential. Short-term on-the-job training.	May 2015 median annual wage: \$20,630	4% Growth projected 2014-24
<b>Tank car, truck, and ship loaders</b>	13,000	Load and unload chemicals and bulk solids, such as coal, sand, and grain into or from tank cars, trucks, or ships using material moving equipment. May perform a variety of other tasks	These occupations usually require a high school diploma. Employees in these occupations need anywhere from	May 2015 median annual wage: \$36,660	4% Growth projected 2014-24

		relating to shipment of products. May gauge or sample shipping tanks and test them for leaks.	a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.		
<b>Hand Laborers &amp; Material Movers</b>	3,719,300	Hand laborers and material movers manually move freight, stock, or other materials. Others feed or remove material to and from machines, clean vehicles, pick up unwanted household goods, and pack materials for moving.	Most hand laborers and material movers work full time. Because materials are shipped around the clock, some workers, especially those in warehousing, work overnight shifts.	Formal education is not usually required to become a hand laborer or material mover. Employers typically require only that applicants be physically able to perform the work.	The median annual wage for hand laborers and material movers was \$24,090 in May 2015.

# SPECIAL OPPORTUNITIES IN TRANSPORTATION

**GARRETT A. MORGAN**  
 TECHNOLOGY AND TRANSPORTATION  
 EDUCATION PROGRAM CLEARINGHOUSE



JOB TITLE	TYPES OF JOBS AVAILABLE	TRAINING NEEDED	EXPECTED SALARY RANGE
<b>United States Coast Guard</b>	A variety of jobs to support the Coast Guard's mission, which is to rescue people in distress, enforce pollution regulations, safeguard commerce on the water-ways, and keep drugs from coming into the country.	A college degree may qualify you for Officer Candidate School or a Coast Guard Direct Commission. Training is also offered at the Coast Guard Academy.	Varies depending on your rank.
<b>Intelligent Transportation Systems</b>	A wide variety of professionals will be needed, including aerospace engineers, environmentalists, systems engineers, computer scientists, and communication engineers.	A bachelor's degree and graduate work may be required.	Varies widely.
<b>Transportation and Security Administration (TSA)</b>	A variety of jobs to support TSA's mission which is to: Protect the nation's transportation systems to ensure freedom of movement for people and commerce.	Varies depending on job. TSA offers training.	Varies depending on your rank.
<b>U.S. Customs and Border Patrol</b>	A variety of jobs to support U.S. Custom's and Border Patrol's mission which is to: To safeguard America's borders thereby protecting the public from dangerous people and materials while enhancing the Nation's global economic competitiveness by enabling legitimate trade and travel.	Varies depending on job. TSA offers training.	Varies depending on your rank.