
Automotive Service Technicians and Mechanics

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Significant Points

- Automotive service technicians and mechanics must continually adapt to changing technology and repair techniques as vehicle components and systems become increasingly sophisticated.
- Formal automotive technician training is the best preparation for these challenging technology-based jobs.
- Opportunities should be very good for automotive service technicians and mechanics with diagnostic and problem-solving skills, knowledge of electronics and mathematics, and mechanical aptitude.

Nature of the Work

Automotive service technicians inspect, maintain, and repair automobiles and light trucks that run on gasoline, electricity, or alternative fuels such as ethanol. Automotive service technicians' and mechanics' responsibilities have evolved from simple mechanical repairs to high-level technology-related work. The increasing sophistication of automobiles requires workers who can use computerized shop equipment and work with electronic components while maintaining their skills with traditional handtools. As a result, automotive service workers are now usually called technicians rather than mechanics. (Service technicians who work on diesel-powered trucks, buses, and equipment are discussed in the *Handbook* section on diesel service technicians and mechanics. Motorcycle technicians—who repair and service motorcycles, motor scooters, mopeds, and small all-terrain vehicles—are discussed in the *Handbook* section on small engine mechanics.)

Today, integrated electronic systems and complex computers regulate vehicles and their performance while on the road. Technicians must have an increasingly broad knowledge of how vehicles' complex components work and interact. They also must be able to work with electronic diagnostic equipment and digital manuals and reference materials.

When mechanical or electrical troubles occur, technicians first get a description of the problem from the owner or, in a large shop, from the repair service estimator or service advisor who wrote the repair order. To locate the problem, technicians use a diagnostic approach. First, they test to see whether components and systems are secure and working properly. Then, they isolate the components or systems that might be the cause of the problem. For example, if an air-conditioner malfunctions, the technician might check for a simple problem, such as a low coolant level, or a more complex issue, such as a bad drive-train connection that has shorted out the air conditioner. As part of their investigation, technicians may test drive the vehicle or use a variety of testing equipment, including onboard and hand-held diagnostic computers or compression gauges. These tests may indicate whether a component is salvageable or whether a new one is required.

During routine service inspections, technicians test and lubricate engines and other major components. Sometimes technicians repair or replace worn parts before they cause breakdowns or damage the vehicle. Technicians usually follow a checklist to ensure that they examine every critical part. Belts, hoses, plugs, brake and fuel systems, and other potentially troublesome items are watched closely.

Service technicians use a variety of tools in their work. They use power tools, such as pneumatic wrenches to remove bolts quickly; machine tools like lathes and grinding machines to rebuild brakes; welding and flame-cutting equipment to remove and repair exhaust systems, and jacks and hoists to lift cars and engines. They also use common handtools, such as screwdrivers, pliers, and wrenches, to work on small parts and in hard-to-reach places. Technicians usually provide their own handtools, and many experienced workers have thousands of dollars invested in them. Employers furnish expensive power tools, engine analyzers, and other diagnostic equipment.

Computers are also commonplace in modern repair shops. Service technicians compare the readouts from computerized diagnostic testing devices with benchmarked standards given by the manufacturer. Deviations outside of acceptable levels tell the technician to investigate that part of the vehicle more closely. Through the Internet or from software packages, most shops receive automatic updates to technical manuals and access to manufacturers' service information, technical service



Automotive service technicians use several types of diagnostic tools, including pressure gauges and electronic meters.

bulletins, and other databases that allow technicians to keep up with common problems and learn new procedures.

High technology tools are needed to fix the computer equipment that operates everything from the engine to the radio in many cars. In fact, today most automotive systems, such as braking, transmission, and steering systems, are controlled primarily by computers and electronic components. Additionally, luxury vehicles often have integrated global positioning systems, Internet access, and other new features with which technicians will need to become familiar. Also, as more alternate-fuel vehicles are purchased, more automotive service technicians will need to learn the science behind these automobiles and how to repair them.

Automotive service technicians in large shops often specialize in certain types of repairs. For example, *transmission technicians and rebuilders* work on gear trains, couplings, hydraulic pumps, and other parts of transmissions. Extensive knowledge of computer controls, the ability to diagnose electrical and hydraulic problems, and other specialized skills are needed to work on these complex components, which employ some of the most sophisticated technology used in vehicles. *Tuneup technicians* adjust ignition timing and valves and adjust or replace spark plugs and other parts to ensure efficient engine performance. They often use electronic testing equipment to isolate and adjust malfunctions in fuel, ignition, and emissions control systems.

Automotive air-conditioning repairers install and repair air-conditioners and service their components, such as compressors, condensers, and controls. These workers require special training in Federal and State regulations governing the handling and disposal of refrigerants. *Front-end mechanics* align and balance wheels and repair steering mechanisms and suspension systems. They frequently use special alignment equipment and wheel-balancing machines. *Brake repairers* adjust brakes, replace brake linings and pads, and make other repairs on brake systems. Some technicians specialize in both brake and front-end work.

Work environment. While most automotive service technicians worked a standard 40 hour week in 2006, 30 percent worked longer hours. Some may work evenings and weekends to satisfy customer service needs. Generally, service technicians work indoors in well-ventilated and -lighted repair shops. However, some shops are drafty and noisy. Although many problems can be fixed with simple computerized adjustments, technicians frequently work with dirty and greasy parts, and in awkward positions. They often lift heavy parts and tools. Minor cuts, burns, and bruises are common, but technicians can usually avoid serious accidents if safe practices are observed.

Training, Other Qualifications, and Advancement

Automotive technology is rapidly increasing in sophistication, and most training authorities strongly recommend that people seeking work in automotive service complete a formal training program in high school or in a postsecondary vocational school or community college. However, some service technicians still learn the trade solely by assisting and learning from experienced workers. Acquiring National Institute for Automotive Service

Excellence (ASE) certification is important for those seeking work in large, urban areas.

Education and training. Most employers regard the successful completion of a vocational training program in automotive service technology as the best preparation for trainee positions. High school programs, while an asset, vary greatly in scope. Graduates of these programs may need further training to become qualified. Some of the more extensive high school programs participate in Automotive Youth Education Service (AYES), a partnership between high school automotive repair programs, automotive manufacturers, and franchised automotive dealers. All AYES high school programs are certified by the National Institute for Automotive Service Excellence. Students who complete these programs are well prepared to enter entry-level technician positions or to advance their technical education. Courses in automotive repair, electronics, physics, chemistry, English, computers, and mathematics provide a good educational background for a career as a service technician.

Postsecondary automotive technician training programs usually provide intensive career preparation through a combination of classroom instruction and hands-on practice. Schools update their curriculums frequently to reflect changing technology and equipment. Some trade and technical school programs provide concentrated training for 6 months to a year, depending on how many hours the student attends each week, and award a certificate. Community college programs usually award a certificate or an associate degree. Some students earn repair certificates in a particular skill and leave to begin their careers. Associate degree programs, however, usually take 2 years to complete and include classes in English, basic mathematics, computers, and other subjects, as well as automotive repair. Recently, some programs have added classes on customer service, stress management, and other employability skills. Some formal training programs have alliances with tool manufacturers that help entry-level technicians accumulate tools during their training period.

Various automobile manufacturers and participating franchised dealers also sponsor 2-year associate degree programs at postsecondary schools across the Nation. Students in these programs typically spend alternate 6- to 12-week periods attending classes full time and working full time in the service departments of sponsoring dealers. At these dealerships, students work with an experienced worker who provides hands-on instruction and timesaving tips.

Those new to automotive service usually start as trainee technicians, technicians' helpers, or lubrication workers, and gradually acquire and practice their skills by working with experienced mechanics and technicians. In many cases, on-the-job training may be a part of a formal education program. With a few months' experience, beginners perform many routine service tasks and make simple repairs. While some graduates of postsecondary automotive training programs are often able to earn promotion to the journey level after only a few months on the job, it typically takes 2 to 5 years of experience to become a fully qualified service technician, who is expected to quickly perform the more difficult types of routine service and repairs. An additional 1 to 2 years of experience familiarizes technicians with all types of repairs. Complex specialties, such as

Projections data from the National Employment Matrix

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-16	
				Number	Percent
Automotive service technicians and mechanics.....	49-3023	773,000	883,000	110,000	14

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

transmission repair, require another year or two of training and experience. In contrast, brake specialists may learn their jobs in considerably less time because they do not need complete knowledge of automotive repair.

Employers increasingly send experienced automotive service technicians to manufacturer training centers to learn to repair new models or to receive special training in the repair of components, such as electronic fuel injection or air-conditioners. Motor vehicle dealers and other automotive service providers may send promising beginners or experienced technicians to manufacturer-sponsored technician training programs to upgrade or maintain employees' skills. Factory representatives also visit many shops to conduct short training sessions.

Other qualifications. The ability to diagnose the source of a problem quickly and accurately requires good reasoning ability and a thorough knowledge of automobiles. Many technicians consider diagnosing hard-to-find troubles one of their most challenging and satisfying duties. For trainee automotive service technician jobs, employers look for people with strong communication and analytical skills. Technicians need good reading, mathematics, and computer skills to study technical manuals. They must also read to keep up with new technology and learn new service and repair procedures and specifications.

Training in electronics is vital because electrical components, or a series of related components, account for nearly all malfunctions in modern vehicles. Trainees must possess mechanical aptitude and knowledge of how automobiles work. Experience working on motor vehicles in the Armed Forces or as a hobby can be very valuable.

Certification and advancement. ASE certification has become a standard credential for automotive service technicians. While not mandatory for work in automotive service, certification is common for all non entry-level technicians in large, urban areas. Certification is available in 1 or more of 8 different areas of automotive service, such as electrical systems, engine repair, brake systems, suspension and steering, and heating and air-conditioning. For certification in each area, technicians must have at least 2 years of experience and pass the examination. Completion of an automotive training program in high school, vocational or trade school, or community or junior college may be substituted for 1 year of experience. For ASE certification as a Master Automobile Technician, technicians must be certified in all eight areas.

By becoming skilled in multiple auto repair services, technicians can increase their value to their employer and their pay. Experienced technicians who have administrative ability sometimes advance to shop supervisor or service manager. Those with sufficient funds many times open independent automotive repair shops. Technicians who work well with customers may become automotive repair service estimators.

Employment

Automotive service technicians and mechanics held about 773,000 jobs in 2006. Automotive repair and maintenance shops and automotive dealers employed the majority of these workers—29 percent each. In addition, automotive parts, accessories, and tire stores employed 7 percent of automotive service technicians. Others worked in gasoline stations; general merchandise stores; automotive equipment rental and leasing companies; Federal, State, and local governments; and other organizations. Almost 17 percent of service technicians were self-employed, more than twice the proportion for all installation, maintenance, and repair occupations.

Job Outlook

The number of jobs for automotive service technicians and mechanics is projected to grow faster than average for all occupations over the next decade. Employment growth will create many new jobs, but total job openings will be significantly larger because many skilled technicians are expected to retire and will need to be replaced.

Employment change. Employment of automotive service technicians and mechanics is expected to increase 14 percent between 2006 and 2016, compared to 10 percent for all occupations. It will add a large number of new jobs, about 110,000, over the decade. Demand for technicians will grow as the number of vehicles in operation increases, reflecting continued growth in the driving age population and in the number of multi-car families. Growth in demand will be offset somewhat by continuing improvements in the quality and durability of automobiles, which will require less frequent service.

Employment growth will continue to be concentrated in automobile dealerships and independent automotive repair shops. Many new jobs also will be created in small retail operations that offer after-warranty repairs, such as oil changes, brake repair, air-conditioner service, and other minor repairs generally taking less than 4 hours to complete. Employment of automotive service technicians and mechanics in gasoline service stations will continue to decline, as fewer stations offer repair services.

Job prospects. In addition to openings from growth, many job openings will be created by the need to replace a growing number of retiring technicians. Job opportunities in this occupation are expected to be very good for those who complete high school or postsecondary automotive training programs and who earn ASE certification. Some employers report difficulty in finding workers with the right skills. People with good diagnostic and problem-solving abilities, and training in basic electronics and computer courses are expected to have the best opportunities. Those without formal automotive training are likely to face competition for entry-level jobs.

Most people who enter the occupation can expect steady work, even during downturns in the economy. Although car owners tend to postpone maintenance and repair on their vehicles when their budgets are strained, employers usually cut back on hiring new workers during economic downturns instead of letting experienced workers go.

Earnings

Median hourly wage-and-salary earnings of automotive service technicians and mechanics, including commission, were \$16.24 in May 2006. The middle 50 percent earned between \$11.96 and \$21.56 per hour. The lowest 10 percent earned less than \$9.17, and the highest 10 percent earned more than \$27.22 per hour. Median annual earnings in the industries employing the largest numbers of service technicians were as follows:

Local government, excluding schools.....	\$19.07
Automobile dealers	18.85
Automotive repair and maintenance	14.55
Gasoline stations	14.51
Automotive parts, accessories, and tire stores	14.38

Many experienced technicians employed by automobile dealers and independent repair shops receive a commission related to the labor cost charged to the customer. Under this system, weekly earnings depend on the amount of work completed. Employers frequently guarantee commissioned technicians a minimum weekly salary.

Automotive service technicians who are members of labor unions, such as the International Association of Machinists and Aerospace Workers; the International Union, United Automobile, Aerospace, and Agricultural Implement Workers of America; the Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters, may enjoy more benefits than non-union workers do.

Related Occupations

Other workers who repair and service motor vehicles include automotive body and related repairers, diesel service technicians and mechanics, and small engine mechanics.

Sources of Additional Information

For more details about work opportunities, contact local automobile dealers and repair shops or local offices of the State employment service. The State employment service also may have information about training programs.

For general information about a career as an automotive service technician, contact:

- AutomotiveCareersToday,8400WestparkDr.,MS#2,McLean, VA 22102. Internet: <http://www.autocareerstoday.org>
- Career Voyages, U.S. Department of Labor, 200 Constitution Ave., NW., Washington, DC 20210.

Internet:

<http://www.careervoyages.gov/automotive-main.cfm>

- National Automobile Dealers Association, 8400 Westpark Dr., McLean, VA 22102. Internet: <http://www.nada.org>

A list of certified automotive service technician training programs can be obtained from:

- National Automotive Technicians Education Foundation, 101 Blue Seal Dr., SE., Suite 101, Leesburg, VA 20175.

Internet: <http://www.natef.org>

For a directory of accredited private trade and technical schools that offer programs in automotive service technician training, contact:

- Accrediting Commission of Career Schools and Colleges of Technology, 2101 Wilson Blvd., Suite 302, Arlington, VA 22201. Internet: <http://www.accsct.org>

Information on automobile manufacturer-sponsored programs in automotive service technology can be obtained from:

- Automotive Youth Educational Systems (AYES), 100 W. Big Beaver, Suite 300, Troy, MI 48084.

Internet: <http://www.eyes.org>

Information on how to become a certified automotive service technician is available from:

- National Institute for Automotive Service Excellence (ASE), 101 Blue Seal Dr. SE., Suite 101, Leesburg, VA 20175.

Internet: <http://www.asecert.org>