

CAREERS IN AUTO RACING: WORK IN THE FAST LANE

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Long before most people had seen an automobile, thrill-seekers across the globe were driving cars competitively. The first recorded auto race in the United States took place in 1895 in Illinois. The winner covered the 54-mile course in a little more than 10 hours.

The speed of racecars has accelerated steadily since then, as has the popularity of the sport. In public opinion polls of sports popularity, in fact, auto racing consistently finishes near the top. And racecar drivers may be the star of their event, but they depend on support from many others—including some workers who aren't on the track.

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The person behind the wheel is just one of many driving the sport of auto racing. Learn about workers on the track and in the shop who contribute to the thrill of race day.

You don't have to be behind the wheel to pursue a career in auto racing. From pit crews to promoters, a variety of workers contribute to the excitement of race day. The following pages provide information about occupations in the racing industry. After an introduction to the sport, you'll read about what these workers do, either on the track or in the workshop, and how they train. And you'll learn where to find more information.

Types of auto racing

Modern motorsports are a vast industry. Professional drivers compete for prize money—known as a purse—in everything from go-karts to tractor-trailers. In the United States, however, three types of motor racing are most prominent: stock car, open wheel, and drag.

Stock car racing features cars that are based on commonly manufactured production vehicles sold to the public. Stock racecars range from those that are minimally modified to those that are custom-built and share only their external appearance with production vehicles. Races generally are held on oval tracks with steeply banked turns.

The National Association for Stock Car Auto Racing—better known as NASCAR—is the most prominent stock car racing organization. But there are several smaller, usually regional, stock car associations. These organizations often serve as a training ground for racers and crews who later rise to prominence on the NASCAR circuit.

Open-wheel racing features custom-built racecars with exposed wheels and an open cockpit. The most prominent open-wheel racing organization in the United States is the Indy Racing League. Most Indy races are on oval tracks. A few races, however, are held on closed public streets or on courses built to mimic public streets.

Drag racing is a form of organized racing in which two vehicles race along a straight course—a drag strip—that is usually a quarter-mile long. Cars in drag racing range from stock production autos to highly specialized, custom-built vehicles.

Most drag races in the United States are governed by the National Hot Rod Association. A smaller organization, the International Hot Rod Association, governs nearly all remaining U.S. drag races.

On the track

According to the 2009 National Speedway Directory, there are about 1,800 racing venues throughout the United States, and every event requires drivers and pit crews.

The specifics of the track and pit depend on the type of car being raced. Speed enthusiasts, for example, might be drawn to drag racing, in which cars with 7,000-horsepower engines reach speeds of 330 miles per hour. Other races have different paces and require different skills—from both drivers and crews.

Racecar driver

A racecar driver maneuvers his or her car through the course, around the track, or up the strip—at the fastest possible speed. To do this, the driver must remain acutely aware of track conditions and the position of other drivers.

All drivers make quick decisions about shifting gears, braking, and accelerating. Then, they execute these tasks while traveling at high speed. They must understand the geometry of the racetrack to move efficiently.

While successfully maneuvering past a competitor, drivers must also prevent other competitors from passing them. Drivers consider every detail, from the position of their own bodies to weather conditions, and constantly reevaluate and monitor the performance of their car.

Racecar drivers must skillfully maneuver cars at high speed.



In stock car and open-wheel racing, drivers seek maintenance in the designated “pit” area of the track. To make these pit stops, drivers must position their car properly when entering the pit area, because misalignment costs time.

And drivers don’t just drive; they also make special appearances to promote their team, sponsors, and racing organization. Like other professional athletes, racecar drivers answer fans’ questions and sign autographs.

Pit crew

The pit crew is a vital part of the racing team. These workers take care of the racecar’s mechanical needs during pit stops. Pit stops usually involve refueling, tire changes, and mechanical repairs.

Depending on the length of the race, the driver may need to make several pit stops. The type and size of car, the volume of fuel it holds, and the length of the race determine what type of work must occur during a pit stop.

While stopped, drivers lose their race position relative to other drivers. Therefore, it is critical that pit stops are completed as quickly as possible. A standard pit stop takes about 15 seconds, in contrast to more than a minute in racing’s early days. Not surprisingly, crew members are usually physically fit; some are former college athletes who have the

strength and agility to perform pit tasks quickly and accurately.

The planning of pit stops is a key part of racing strategy. Before a race, the pit crew ensures that the car is mechanically sound and that all fuel, tools, parts, and equipment needed for pit stops are in place. During the race, the crew works to keep the car running; afterward, there’s cleanup and evaluation of performance. Between races, they practice pit stops.

Below are job descriptions for several members of the pit crew.



On the track, pit crews take care of their team car's mechanical needs.

Crew chief. This worker plans and organizes all race preparations. Duties vary, depending on the type of race. For example, a crew chief on a hot rod may also be involved in the tuning of the engine prior to the race. On some stock car teams, the crew chief manages work schedules, handles employee training, and is a parts supply liaison.

Pit coach. Major stock racing teams have a pit coach, who is responsible for ensuring smooth pit stops. Job tasks may include developing weekly pit practices and workouts. In top-level racing series, pit crews have a full-time training regimen because every fraction of a second is important and requires preparation.

Gas person. In longer races, cars need to be refueled. A gas person handles the fueling of the car. Fuel is held in containers that keep an exact amount of fuel. After the pit stop, the gas person measures the amount of remaining fuel to calculate when the next pit stop must occur.

Jack operator. This worker operates the jack that lifts the car so the tires can be changed. The driver knows it is safe to go when the jack operator drops the car after changing the last set of tires.

Tire carrier, changer, and catcher. A tire carrier brings tires to the front and back of the car and assists the tire changer in replacing them. Tire changers operate the air gun that loosens and tightens the lug nuts. Changers then roll the used tire toward a tire catcher, who removes it from the pit area.

Windshield cleaner. The windshield cleaner ensures visibility by washing the windshield to remove buildup such as dirt, oil, rubber, and bugs that have accumulated there.

Mechanic. Pit mechanics specialize in either under-car or front-end setups. The under-car specialist is concerned with the engine, transmission, and other drivetrain components. The front-end specialist insures that various parts of the car associated with tire alignment are properly adjusted.

Some auto racing mechanics also have jobs in the workshop. Their tasks are described in the section on shop workers.

Scorer and spotter. A scorer tracks the lap times for the car to help determine speed and total racing time. The spotter stays in communication with the driver during the race and informs the driver of any issues on the track, such as oil spots, crashes, and competitor positions.

In the shop

All racecars start in the workshop—more commonly known as the “shop”—and end up back there. Most shops have specific areas dedicated to fabrication, mechanics, paint, parts, and engines. Shop workers prepare more than one car for a race, because teams need to have a backup ready for each event. And teams often tailor car preparation to specific tracks.

Occupations

In-shop workers include mechanical engineers, mechanics, fabricators, and painters. All of them are supervised by a shop foreperson.

Shop foreperson. The shop foreperson plans and coordinates all the activities of shop workers. The foreperson also acts as a liaison between the shop workers and the trackside crew chiefs and addresses problems the chief notices during a race.

Mechanical engineers. Mechanical engineers develop, design, and test new auto bodies, engines, and tools. Using design software, these workers create the plans that mechanics and other technicians use when producing parts and assembling the vehicles. Engineers consider every aspect of a car’s design, from aerodynamics to engine torque. They also factor in safety considerations.

Mechanics. Mechanics prepare the cars for races. They diagnose mechanical

problems, tune the engine, adjust chassis and wheel alignment, and perform many other tasks that help performance.

Racing mechanics are often specialized. Examples include engine tuner and suspension specialist. Constant repetition with the same product allows mechanics to complete work quickly and efficiently. Their knowledge and skills depend on the rules of the various racing series. But diagnostic skills are important for mechanics in auto racing to maximize performance.

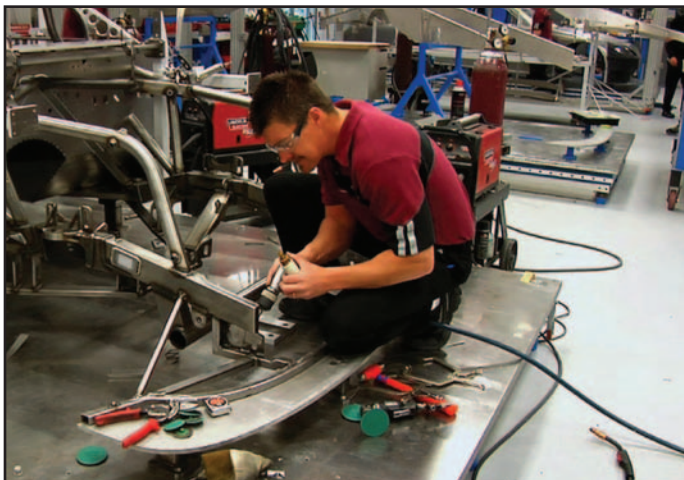
Fabricators. Fabricators create the highly specialized pieces of the racecar, repair autobody damage, and make adjustments to reduce the body’s contact with the track. By cutting and welding prefabricated parts, fabricators create the pieces a particular racecar needs.

Body hangers. Body hangers attach the autobody shell to the car’s frame. Strict standards apply to fitting metal templates to specific points on the car. Manufacturers have specialists perform this task for race shops, but some shops also employ their own body hangers.

Painters. Painters apply the base colors and coatings to racecars. Almost every part of a racecar is painted in a process that takes about 2 days. A recent time-saving innovation involves “wrapping,” covering all or part of the car in vinyl. Wrapping makes it possible to change a car’s color scheme in 4 hours or less.

Shop mechanics may have to repair car parts damaged during an event.

Photo: National Science Foundation



Employment and wages

The U.S. Bureau of Labor Statistics (BLS) does not have employment and wage data specific to occupations in auto racing. Businesses involved in the operation of auto races—including racing teams—are classified within the spectator sports industry. But this industry also includes nonracing sports businesses. In addition, establishments classified in other industries provide support to the auto racing industry. As a result, BLS can’t determine exactly how many workers are employed in auto racing.

But many of these jobs are specialized versions of occupations for which BLS does have data. And because employees of racing teams are classified within the spectator sports industry, wages for racing-related occupations within that industry are the best approximation of wages for those in the auto racing industry. Median annual wages for selected occupations are presented in the table below.

Drivers compete professionally in venues ranging from rural dirt tracks to modern speedways. Some are part-time drivers racing for purses that barely cover their expenses; others get staggering sums that they supplement with income from product endorsements. Prominent professional drivers usually have a contractual agreement with a sponsor or racing team owner, and they receive a percentage of the prize money. Top NASCAR drivers, for example, might receive between 40 and 50 percent of the purse, with team sponsors, owners, or members splitting the remainder.

Preparing for a career in auto racing

Preparation for a career in auto racing often starts with interest in the sport at an early age. And that interest may be paired with automotive knowledge developed through exposure to engines: growing up around machinery on a farm, perhaps, or mechanical training during military service.

Auto racing workers sometimes have similar knowledge and skills, but specific

education, training, and requirements vary by occupation. Racecar drivers, for example, must have highly developed driving skills but do not need a college degree. Mechanical engineers, on the other hand, must have a bachelor's degree. Advancement opportunities also vary.

Skills

Familiarity with car engines, bodywork, and mechanical technology is common among workers in auto racing. Strong math skills are essential for making calculations, such as those for fuel consumption or for measuring a car's clearance, during an event. And proficiency in the use of testing and diagnostic equipment is useful for vehicle maintenance.

Communication skills are important for most workers in racing occupations, especially for racecar drivers and shop workers. In addition to communicating with the pit crew during a race, drivers are expected to make public appearances off the track and must be able to relate to fans and the media. Shop workers need to interact with each other to prepare vehicles for an event.

Management skills are a must for a foreperson, who functions as the shop supervisor. In addition to their knowledge of shop operations, which they usually gain through on-the-job experience, forepersons should know how to direct shop workers. They need leadership, problem-solving, and communication skills, as well as the abilities to coordinate work, set priorities, and motivate others.

Athletic ability is necessary for pit crew workers. They need strength and coordination

Median annual wages for selected occupations in the spectators sports industry, May 2008

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| Automotive body and related repairers | \$54,750 |
| Automotive service technicians and mechanics | 51,160 |
| First-line supervisors and managers of mechanics, installers, and repairers | 67,960 |
| Helpers of installation, maintenance, and repair workers | 23,780 |
| Machinists | 45,060 |
| Mechanical engineers | 78,320 |
| Painters of transportation equipment | 52,870 |

to perform their tasks—including lifting and carrying heavy equipment—quickly, safely, and accurately. Many crew members have participated in formal athletic programs in other sports.

Education and training

Although students interested in auto racing often start honing car skills well before their teen years, by high school they should take certain classes if they expect to make a career in racing. Math is a must, but vocational-technical courses are also important. Post-secondary coursework may also be required, especially where vocational courses are not offered in high school.

To become a mechanic, students should take automotive maintenance and repair courses. Manufacturers' specialty courses and automotive mechanics courses include more in-depth information about vehicles. These courses are valuable not only for mechanics but often for drivers, fabricators, and painters as well. Technical preparatory schools, such as the NASCAR Technical Institute, specialize in racing technology education.

Fabricators need coursework in welding and metalworking, particularly specialized welding and sheet metal. Modern race teams often construct their own parts, so certification in specialized welding is useful. On-the-job training is also common for fabricators.

Painters may find it helpful to take vocational-technical courses in automotive body painting. Some schools maintain facilities to paint cars as well as to perform basic body repairs. Many painters also learn on the job.

Drivers must complete courses to get licensed in operating high-speed vehicles. In addition, drivers often take courses to maintain their driving skills or to eliminate problems that develop. There are numerous schools that help racecar drivers improve their skills.

Mechanical engineers need to earn at least a bachelor's degree, most commonly in mechanical engineering, from an accredited university. Programs tailored to the automotive industry are available at some

universities; a few graduate programs also exist. Continuing education courses are available through professional associations.

Advancement

Opportunities for advancement for workers in auto racing are often tied to experience and networking—and, sometimes, geographic location. But some occupations have more specific paths for moving forward.

Most racecar drivers, for example, don't begin on the big tracks. Drivers might get their start racing go-karts and later work their way up from lower-level auto races. By gaining experience and taking specialized courses, drivers are able to control faster and more powerful cars as they advance in auto racing.

Shop forepersons usually work their way up from the shop floor to management. Through experience, they gain knowledge of each shop worker's job and then apply that knowledge to running the shop efficiently. Along with shop experience, though, forepersons need expertise in racing. They might spend time on the track or as a crew chief.

Other workers in auto racing advance by gaining experience on the job. Many have opportunities through family- or friend-owned businesses and projects. In fact, networking is an important element of advancing in auto racing. Workers should develop contacts and be prepared to use them. By starting at a local track and working their way up, they can expand their list of connections.

Geographic location is a factor in auto racing, and achieving success may require relocating. In the case of NASCAR, for example, most team shops are located near Charlotte, North Carolina, so workers who want to rise to NASCAR ranks must live there.

For more information

To learn more about careers in auto racing, visit your local library. Look for resources about the occupations described in this article, as well as about the auto racing industry itself.

Many of these occupations have counterparts outside of racing, and the *Occupational*

Outlook Handbook has descriptions of them. The descriptions include working conditions, job duties, employment, wages, training requirements, and more. Find the *Handbook* in libraries or online at www.bls.gov/ooh.

Professional associations also offer career information for people interested in racing. Many provide news about drivers, racing schools, and job openings.

For general information and racing news, contact:

National Speed Sport News
P.O. Box 1210
Harrisburg, NC 28075
Toll free: 1 (866) 455-2531
www.nationalspeedsportnews.com

For information about engineers, contact:

American Society of Mechanical
Engineers
3 Park Ave.
New York, NY 10016
Toll free: 1 (800) 843-2763
www.asme.org

SAE International
400 Commonwealth Dr.
Warrendale, PA 15096
(724) 776-4841
www.sae.org

For information about mechanics, contact:
National Automotive Technicians

Education Foundation
101 Blue Seal Dr. SE.
Suite 101
Leesburg, VA 20175
(703) 669-6650
www.natef.org

Universal Technical Institute, Inc.
NASCAR Technical Institute
220 Byers Creek Rd.
 Mooresville, NC 28117
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U.S. Air Force photo by Larry McTighe

