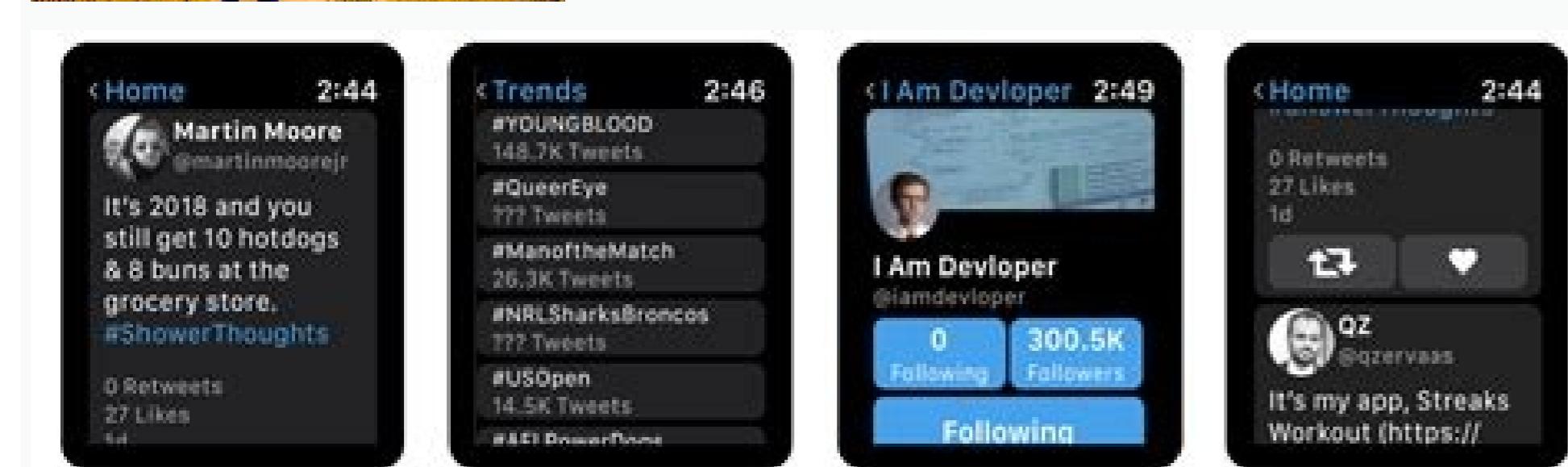


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Watching car racing, whether it's Formula One, NASCAR or dirt track, is adrenaline pumping and fun. Hopping into your Honda Fit or Toyota Corolla and tearing down the road (safely, of course) keeps the fun going. Oh, you don't think so? Actually, those two little economy cars have more in common with race cars than you might think and we're not talking about tuned or tricked out Fits or Corollas. Right out of the factory, car racing technology has influenced production cars in some surprising ways. Car racing teams have always sought to build the fastest and best-performing cars possible. They've enlisted some of the top car designers and engineers to help with the job. When car racing has a breakthrough, it is almost always applicable in some form to mass-produced cars. As a result, race technology has influenced many of the components of the car sitting in your driveway -- from the basic engine design, to the position of the ignition, and even the rearview mirror. As it turns out, you don't have to go much further than your own garage to have a race car experience. To find out the top 10 racing technologies that might be in your car, keep reading. Most drivers in the United States use automatic transmissions, which makes cruising around town worlds apart from a hard-shifting lap on a Formula One track. But, the purpose of a transmission in a race car and a road car are the same: it translates the engine's power to the car's wheels. While an automatic transmission shifts gears with no input from the driver (other than the initial selection of Drive), a manual transmission lets the driver control the flow of power from the engine to the wheels. Race car drivers want the control of a manual transmission, but the manual process can be too slow and prone to human error. Enter Direct-Shift Gearboxes (DSG) and clutchless manual transmissions. Both of these types of gearboxes are racing technology that allows drivers to shift gears quickly and make sure that they shift into the correct gear. DSGs actually work like two transmissions: one dial in the odd numbered gears and one dial in the even numbered gears. Because there are two transmissions, the next needed gear is always "on deck" which makes the DSG faster than a manual transmission. DSGs also don't use a clutch pedal, which makes them faster than a conventional manual, and less prone to driver error. DSGs are a fun addition to road cars (right now they are mainly seen on sporty Audi and Volkswagen models) because they allow drivers the fun of a manual without the hassle of a clutch pedal. Similarly, clutchless manuals, or automatic transmissions with a manual mode take the idea of engine control without a clutch pedal and sequential shifting and put it into production cars. These systems are becoming more common on passenger cars with automatic transmissions; however, they're not as fast-shifting as DSGs. Basically, they're automatic transmissions that allow the driver to select when the car changes gears, but the driver doesn't have to use a clutch pedal. Similar to racing transmissions, these systems allow drivers to shift only in sequence. On a manual transmission, the driver can shift gears out of order -- going from first to third -- either intentionally or by mistake. Doing it by mistake can spell disaster in a race, so race cars have Sequential Manual Transmissions (SMTs). SMTs only shift in order: from first, to second, to third, and so on. Automatic transmissions with manual modes do the same thing -- they put the control of the engine in the hands of the driver while minimizing error. Running late? Read on to see how car makers have taken racing technology that's meant to shave seconds off of lap times and used it to help you shave time off your trip to the grocery store. You shouldn't try to steal someone's Porsche, but if you do, here's a tip: the ignition is on the left side of the steering wheel. It's an odd placement for most people -- just ask all the would-be Porsche buyers who've been embarrassed on test drives -- but it's a nod to Porsche's racing heritage. In racing, every second counts. With a left hand ignition, drivers can start the car and shift into first gear almost simultaneously, allowing them to get going that much faster than the competition. But what's faster than turning a key (and easier than doing it with your left hand) is push button ignition. A number of production cars are using this racing technology, which starts the car at the touch of a button, not the turn of a key. There are a number of variations to the push button systems. BMW, for example, has drivers insert the key into a slot before pushing the button -- this makes sure that the driver is actually intending to start the car. Others, like Infiniti, have an electronic fob that communicates with the car. When someone carrying the fob approaches the car, the car doors are instructed to unlock -- no more fumbling with your keys. When the car detects that the fob is inside the vehicle, the button is activated and will start the car when pushed -- similar to many race cars. We don't want to keep you in suspense any longer than necessary. Read the next page to find out the everyday car technology that ranks as number 8 on our list. Car Racing in Popular Culture Time to drop the hammer, Harry, and talk about car racing in popular culture. Whether it's street racers in "The Fast and the Furious," Cole Trickle in the Mello Yello Car, or even "Herbie the Love Bug," the glamour and speed of car racing has provided plenty of fodder for popular culture. You might not think about your car's suspension (until you go over a particularly deep pothole), but its one area where racing technology has translated almost directly to production cars. In car racing, it's best to have all four tires maintain contact with the track. That makes the car more stable and makes sure that all the power the engine creates is helping to move the car along. Like most production cars, race cars use independent suspensions. These suspensions allow each wheel to move without affecting the movement of the other wheels. Formula One cars use multi-link suspensions, while NASCAR cars tend to use MacPherson struts. Both suspension types are available on a number of production cars. So, why doesn't your car handle like a race car? While the suspension types may be the same, the adjustment of a NASCAR or Formula One suspension is completely different than the suspension adjustment on your car. In a race car, the suspension has to keep the car stable through turns that generate more force than a production car could handle, as well as extreme acceleration and stopping. Before you go out and adjust your suspension to mimic a race car's capabilities, remember your car has specialized suspension adjustments too: It's adjusted to balance comfort with performance. Comfort doesn't enter the equation for most race car suspensions. Getting tired? Hopefully not, as we have only 7 more everyday car technologies to discuss with you on our countdown to number 1. Check out the next page for number 7 on our list. How stock is stock car racing? NASCAR, the most popular type of car racing in the United States, grew from people racing their everyday cars. So, can you waltz into your local dealership and pick up a track-ready ride? Not really. Though NASCAR cars are based on production cars, the conditions they race under are so extreme, there's not much that's stock in stock car racing. Most drivers don't think about their tires until they get a flat. That's a shame, because tires are what connect the car to the road and keep the driver in control. Car racing teams understand that. That's why they use high performance tires tailored to their particular form of racing. Technology from those specialized tires has trickled down to production cars. You've probably noticed that the tires on your car have grooves in them. These grooves allow the tire to channel things like water, or even snow and slush, away from the car. If you have off-road or all-terrain tires on your car, the grooves are likely very deep and the rubber very bumpy. That type of tire gives the car teeth that can grip uneven or loose surfaces. If you have a sport's car, the tires likely have a fewer number of grooves and the grooves are typically shallower. That allows more of the tire's rubber to maintain contact with the road, making the car handle better. All of these innovations and the development of different tire types came from racing. Like most racing technologies, high-performance racing tire technology has been translated into production cars for everyday use. For example, F1 and NASCAR cars use tires with very soft rubber. That rubber gets sticky when it's heated, which helps hold the car to the track. While that may sound great, don't go buy a set of racing tires just yet. That softer rubber has a short wear life -- you'll notice that a race car gets several new sets of tires over the course of a single race -- while the tires on most production cars are designed to last for many tens of thousands of miles. Many basic tire designs have evolved from racing innovations, but once again, production cars have put it to everyday use. It's not time to stop reading yet! Check out the next page to learn how racing technology literally put the brakes on your car. Unless you've been in a cheesy action movie, the brakes on your car are likely drama-free. Race car brakes are built with the same drama-free goal, but when stopping a car going more than 200 miles an hour, the stakes are much higher. Racing engineers have designed brakes that provide sure stops under extreme circumstances and those designs have made their way onto road cars. Disc brakes started appearing on race cars in the 1950s. Racing teams liked them because they were powerful and easier to maintain than the prior drum brake design. Disc brakes are also easier to keep cool. When brakes stop a car, they generate a lot of friction and heat. That heat actually reduces the stopping power of the brakes. Disc brakes can be vented, which allows the heat to dissipate. Now, all but a few cars have disc brakes on at least their front wheels -- most have disc brakes on all four corners. Racing technology keeps bounding ahead. While most production cars have cast iron disc brakes, race cars use materials that are lighter and often more durable. Ceramic disc brakes have been used on race cars for some time, and are now showing up as options on some luxury sports cars. Many racing teams have also started using super light and super strong brakes made from carbon. That's a technology that won't show up on production cars for some time -- it's currently very expensive. Before a race car (or your car) can stop, it has to get going. Keep reading to learn how racing technology helps your car breathe easier and go faster, too. Car racing is full of breathless excitement -- but not for the engines. Car engines need to breathe freely and easily for best performance, just like you do when you're exercising. Since car engines create power through combustion, getting enough air is vital. They won't work without it. The more air that gets into an engine, the better it will breathe. Also, engines give their best performance when the air they receive is cold. The cold air thickens the air/fuel mixture the engine burns, which allows the engine to get more energy out of it. Enhancements like superchargers and ram air intakes are designed just for that purpose. Surprisingly, superchargers aren't allowed on NASCAR or Formula One race cars; however, they are used on dragsters. One of the more widely known drag racing organizations is the National Hotrod Association. While NASCAR and Formula One technology produces cars that are built for speed and handling, dragsters are built for one thing: straight-line speed. As drag racers have used superchargers and ram air intakes to improve the way engines breathe, automakers have adapted the technology for production cars. Although a few production cars do use superchargers and short ram air intakes, these components tend to be aftermarket parts enthusiasts themselves add to cars. Automakers use the same principals on some production performance cars. You've probably seen cars that look like they have nostrils or openings of various shapes and sizes on their hoods. Those are called hood scoops, and they allow more cold air into the engine compartment. Although they don't force air into the engine as quickly as a supercharger or a ram air system, they do bring more air in to cool the engine and improve performance. What other engine improvements have come off the track and into your garage? Keep reading to find out. The last time you went car shopping, you probably had a salesperson tell you the car you're considering had a Dual Overhead Cam engine, or you saw "DOHC" in a car's brochure. But what does that really mean? To get the real specifics, you should read How Car Engines Work. But, in short, engines have valves that open and close to let air in and exhaust out. A camshaft, or cam, opens and closes the valves. If you have two cams on your engine, or dual cams, the valves can be open and shut more rapidly, allowing for better performance. This type of engine design first appeared on race cars in the early 1900s, and is still one of the most popular engine designs today, appearing in lots of production cars. Read the next page to find out how automobile racing can keep your body in shape. You may have guessed from the number 5 item on our list that exterior components on cars, like hood scoops, often have performance purposes. That goes double for race cars. Whether in NASCAR, Formula One or drag racing, everything on the outside of a race car serves a purpose, and that purpose isn't to look good. Still, because we associate the smooth, flowing shapes of race cars with power, performance and glamour, these designs are often translated in production cars. Racing teams, and race car designers, were some of the first to use wind tunnel testing to create the most aerodynamic shapes. Because race cars go so fast, race car engineers and designers created spoilers and air dams to keep the cars stable at speed. Those aerodynamic components looked so good on race cars that automakers soon got into the game and have now added them to many production cars -- in a slightly toned-down form, of course. Bringing lap times down and fuel economy up is the goal of the next item on our list. If you're looking for more material, the next page has it. Race Car Designers Go Mainstream Have you ever pulled up next to a Mustang that doesn't look quite like a Mustang? It was probably a Shelby Mustang, named after legendary race car driver and designer Carroll Shelby. Like other racing legends, his work on the track proved so popular that Ford asked him to modify the Mustang for several special editions. Shelby Mustangs are such great looking cars (and hot performers) that they've become highly coveted collectors' items. One of the reasons race cars are able to post such blistering track times is because they are so light. Of course, it's easy for a race team build a lightweight car when it doesn't need to haul more than one person or even have a full interior. But race car designers have utilized lightweight materials to help make their cars fast. Of course, it's not enough for the materials to be lightweight -- otherwise, race cars would all be made of paper. Race cars operate under extreme stress, so every material in them needs to be strong. One of the most high-tech materials in race cars is carbon fiber. Formula One race car bodies are almost entirely made out of carbon fiber. Carbon fiber is extremely light and strong, and it's starting to appear (in small amounts) on production cars, mainly as decorative accessories. Because it's so light, carbon fiber could radically increase fuel economy in production cars. The problem: It's too expensive to use on most cars. Aluminum is another lightweight, yet strong material that's often used in racecars, primarily for the engine block. Thanks to racing, aluminum engine blocks have been in production cars for some time now, but some automakers are beginning to use aluminum for select exterior body panels, too. In fact, aluminum hoods are becoming more common now than ever before. Since aluminum isn't as expensive as carbon fiber, aluminum components have been able to find their way onto production cars a little faster than the more expensive carbon fiber parts. Car manufacturers like aluminum because it lightens the car, which improves fuel economy, and doesn't take a toll on performance or durability. What's the number 1 car racing technology that's made it into everyday cars? It's a safe bet that it's something you might not be expecting. Read on to find out what it is. Car racing is all about blistering speed, gutsy driving, unlimited power, and -- the most advanced safety equipment in the world? It's true. Because car racing demands extreme performance, it also demands extreme safety. Luckily, for those of us who aren't race car drivers, that safety technology is also deeply ingrained into our everyday cars. In fact, it's so closely tied together that you might not even associate it with car racing at all. The most important piece of safety technology is one you can't even see. All race cars are built around a structure that protects the driver. In open wheel racing -- like Indy Car racing or Formula One racing -- the car's body is made of strong carbon fiber, designed to protect the driver during an impact. In NASCAR and drag racing, a roll cage protects the driver. The roll cage is a network of steel tubes that absorbs impacts, protecting the driver. The same principles that go into NASCAR roll cages go into production car safety cages. Production car safety cages are well-hidden beneath the carpet, headliner material, door trim and other interior features that race cars simply don't have. Want to know one more everyday safety feature that came from racing? It's a component that every car has, but you probably wouldn't expect that it has a racing pedigree. For more information about racing, applied racing technology and racing related topics, follow the links on the next page. Binder, Al. "Review Mirror." Ward's AutoWorld. May 1, 2002. Warren. "Going Keyless: Will Your Next Car Have Keyless Start?" Edmunds.com. Oct. 25, 2007. Charles. "2006 Porsche Cayenne Turbo." Forbes Autos. March 6, 2006. Aaron. "Volkswagen and Audi's Direct Shift Gearbox (DSG/S-Tronic)." About.com.

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