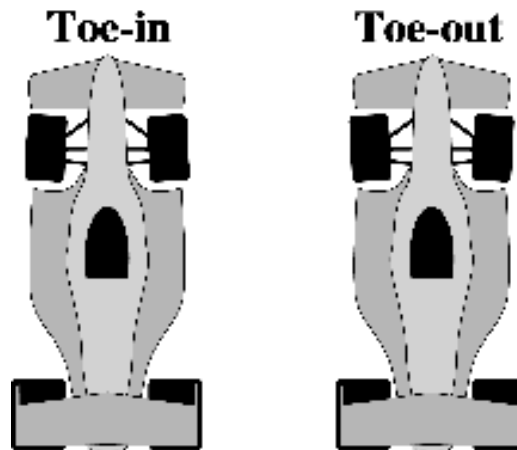


Alignment Explained

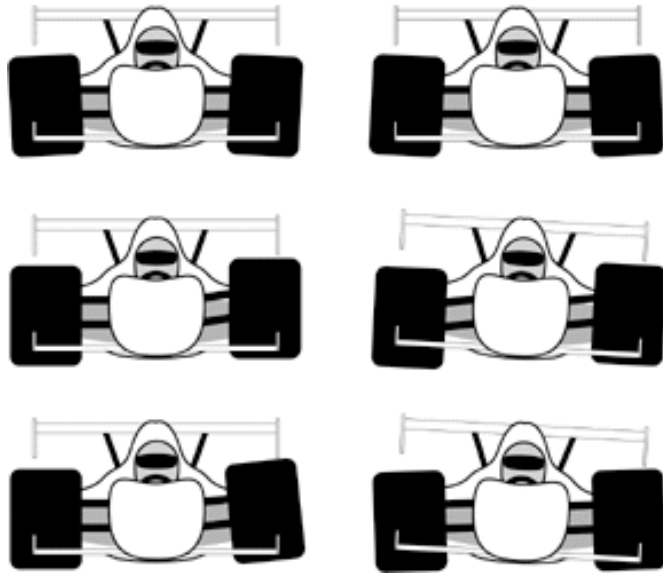
Toe

Toe, simply put, is direction the wheels are pointing. Zero toe would be perfectly parallel wheels pointing straight forward. Toe-out means the front of the tires are farther apart than the rear of the tires. Toe-in means the front of the tires are closer together than the rear of the tires. Toe has different effects on tire wear in the front and in the rear. When the front wheels are toed out, the inside edge of the tire scuff and wear out early. When the front wheels are toed in, the outside edge will scuff and wear out early. However, on rear tires toe usually causes a diagonal cupping wear pattern whether the tires have too much toe in or too much toe out. The diagonal cups are caused by the tires hopping and skipping along the road. It's hard to explain why, but I'll give it a try. Draw an overview of a car with 4 wheels on a piece of paper, make the front wheels parallel, but toe the rear wheels in substantially (say 45 deg. in just to make the demo easier) Now draw lines parallel with the rear tires following their path of travel if they were to roll. You will notice that the lines you have drawn intersect. Since the tires are attached to the car they can not intersect. Instead they roll a bit, then skid outward, roll a bit, then skid outward again. This goes on and on until the tires have diagonal cups worn into the treads where they have been skidding outward. B



Camber

Camber is the lean of the wheel. If the top of the wheel is tilted away from the car, that is called positive camber. If the top of the wheel is tilted in towards the car, that is called negative camber. Camber can cause a pull to one side or the other depending on the direction of the lean. The car will pull in the direction of the wheel with the most positive camber. However, if both sides have the same amount of negative or positive camber, they will cancel each other out and the car will not pull. Camber can cause premature tire wear, but is not as hard on tires as toe is.



Caster

Caster is the hardest to explain of the three commonly used alignment angles. Lots of positive caster is like the forks on a chopper; the wheel is far in front of the support for the wheel. No car uses negative camber. Caster will not affect tire wear, but it can cause a slight drift if it's not equal on both sides. Caster is an angle that only applies to the front (steering) wheels of a car. The more positive caster is, the more stable the car feels, especially at higher speed. More positive caster also improves steering wheel return. To help understand what steering wheel return is, try this experiment: next time you turn a corner, let go of the steering wheel when you are done turning. You will notice that the steering wheel spins back to the centered position. Without positive caster, the steering wheel would stay turned until you manually turned it back to the center position. The only downside to lots of positive caster is it makes the car hard/slow to steer. The reason positive caster adds stability, steering wheel return and increased steering effort is the weight of the car is trying to straighten the wheels. You may notice on some luxury cars with lot of positive caster (and powerful power steering) that the front of the car will rise when the wheel is turned to the side, and sinks as the wheel comes back to center.

