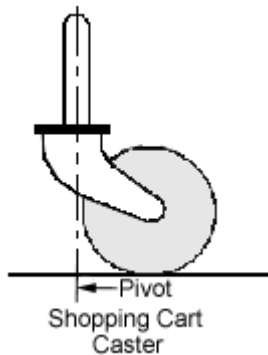
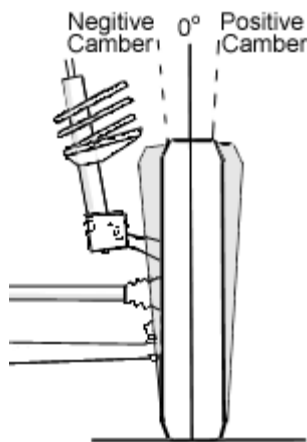


Miata Alignment Basics - Part 1

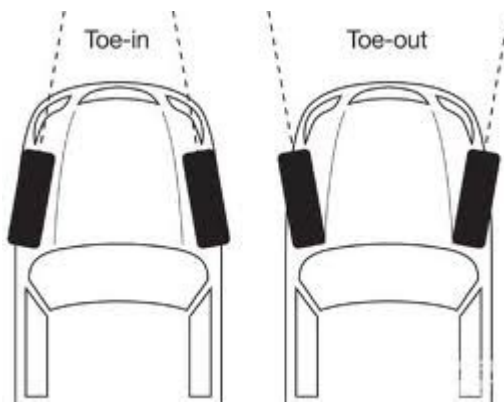
*Since I previously covered the different components of the Miata suspension, I thought I would next touch on how and why they work together. I'd like to quote a statement in the Keith Tanner book of *How to Build a High-Performance Miata*. It is as follows: "The suspension is the area of the car where small changes can have the biggest effects". Proper alignment of the suspension can also have big effects and give you large rewards for a small cost. This month I just want to explain about the adjustments that available on the 4 wheel independent suspension of the Miata. I am not a racer, but like to focus on getting as much performance as I can from my Miata and still have it comfortable for commuting to work.*



The first thing a good alignment tech will do is to find the centerline of the car. Then he will adjust the components to align with that center line. The first adjustment most will make is the "CASTER" of the front wheels. Think of the front Caster wheels on a grocery cart. The Caster of the front wheels is an adjustment to define how the car responds while going forward in a straight line. For street driving we want some "Positive Caster". This helps the car go straight on the highway. For racing or "Autocross", we would want less Positive Caster. This will make the steering more touchy, so the car turns quicker when the steering wheel is turned. I like a Caster setting that will still let the car track straight, but quickly respond to steering input. This is great for sporty drives with the club.



The next item that needs attention is "CAMBER". Have you ever noticed the rear wheels of the Miata in front of you while on a Club Drive? Did you see how the wheels are tilted in on the top, and out at the bottom? This is called "Negative Camber". The reason for this is to work with the body roll of the car in a corner. As you go around a corner at a fun rate of speed, centrifugal force makes the weight of the car transfer to the side of the car at the outside of the corner. This lifts the wheels on the inside of the corner and presses down hard on the wheels at the outside. Because of the suspension of the Miata, this also changes the Camber in a hard curve so the outside wheel is now straight up and down to make the tread flat on the road. So you basically set the amount of negative Camber when the car is at rest, an amount so it keeps the tread flat on the road in a hard corner. The harder you like to corner, the more "Negative Camber" you need in your car. Both front and rear wheels need some Negative Camber, and the rear needs a little more than the front. This works great for all year Miatas.



The next part of the alignment is called “TOE-IN”. This adjustment is very important in determining how touchy the steering is and how well the car can track while going around a corner. It can also effect how the tires wear. The Miata suspension is made up of “A-Arms”. The car has an “A” Shaped Arm at each wheel. To keep the ride less jarring, there are rubber bushings that go over the bolts which hold the A-Arm to the car body. As you go forward, the rubber bushings compress at the rear of the arm. Because of this the wheels are set so that the front of the tires

are pointing in toward each other when the car is at rest. This then sets the wheels more straight forward when driving down the road. For street use, we want a little Toe-In. For track use, we would set the wheels either straight ahead, or even Toe-Out a little. Note that Toe-Out is not good for the street. This makes the car extremely twitchy. You might sneeze and end up off the road across & thru the other lanes of traffic! But in an Autocross race, it will help you get around the pylons quicker. The Rear wheels need a little bit more Toe-In than the Front wheels for street use. I’ll explain how much more next month. If you do not have the difference of Toe-In between the front and wheels enough, the car can want to “understeer”. This makes it hard to get the car to go around the corner. You might find yourself adding more and more steering input to try to get around the corner. If the Toe-In difference between the front and rear is too much, you might find the car “oversteers”. This can be bad! As you are going around the corner at a good rate, the rear of the car may decide to try to get around the corner faster than the front of the car, and you could go spinning off the road! A little Toe-Out & oversteer might be good for autocross to again get you around the next pylon quicker, but not for the street.

So now you know the basics of the Miata alignment components. Next Month I will list some Alignment settings that I found to be great for normal street driving, but will still allow the suspension to do it’s part when Zooming around a corner perhaps faster than you really should. A good alignment just might save your Butt the next time you are pushing it a little more than you should around a corner.

**Zoom-Zoom,
Bill Latsha**