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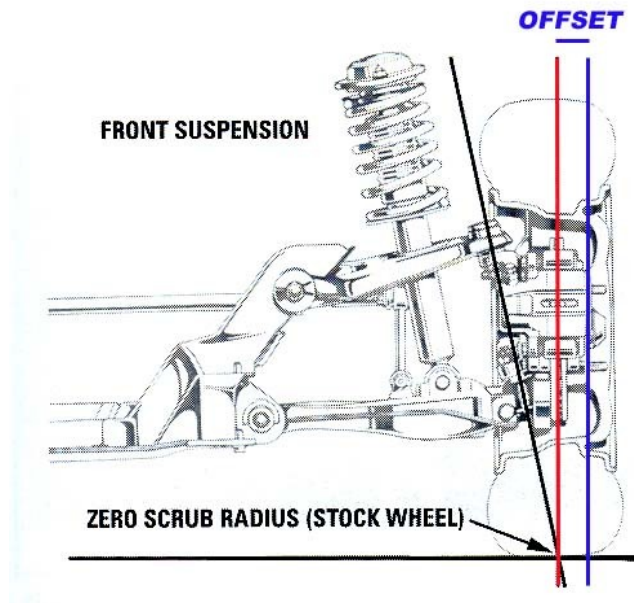
Miata Suspension - Part 3, Wheels

When doing any modifications to your Miata, it is very easy to make it handle or perform worse than it does now by ignoring some of the fundamentals behind it's design. As the car is a purpose designed car, it still has some compromises in the design so the car will please a variety of people. If you ever think you might want to buy different wheels for your Miata, here is some useful information for you to consider.

There are 3 basic parameters you need to consider when buying wheels. One is the "Size" of the wheel. This encompasses the diameter and width at the point the tire is mounted. The second parameter is the "Offset" of the wheel. This is the dimension which is measured from the mounting surface at the back of the wheel, to the centerline of the wheel. The third parameter is the weight of the wheel itself. ALL of these are important to keep in mind.

The size of the wheel varies by the year and model of the Miata you have. The first series of Miatas (NA) started out using a 14" wheel. The NB, or second series used either a 14", 15", or a 16" for the LS and Special Edition models. The third series of Miatas (NC) use a 16" wheel on some models and a 17" wheel on the rest. The 14" wheel is either 5.5" or 6" wide, the 15" wheel is 6" wide, and the NC uses a 16" x 6.5" wheel and a 17 x 7" wide wheel. You can usually use any of the NA or NB Model wheels interchangeably as these are a 4 bolt lug x 100mm pattern, but the NC has a 5 lug x 114mm bolt pattern, so these wheels cannot be used with the earlier Miatas. When considering different wheels, you also have to be sure the wheel inside diameter will clear the larger brakes that are on some of the "upper" models, like the LS, Special Edition, and GT models. You also have to make sure the width of the wheel will accommodate the tire size you want.

The "Offset" of the wheel is also very important to keep in mind.



You can really hurt the handling of the car by varying a lot from the factory recommended offset. You can see in the included picture (Or click the link below) that the wheel centerline is

designed to intersect with the suspension centerline down at the road surface. If you go with a lesser offset, you push the tires out farther away from the car, and can rub the tire against the fender. You also change the "Scrub Radius" which means the tires are not tracking on the centerline of the corner you are going around, so this makes the tires rub along the road surface instead of smoothly rolling around the corner. Too little offset to the extreme can be hard on the wheel bearings causing premature failure. I understand varying 5 to 10mm will not hurt a lot, but more than 10mm can make a noticeable difference in handling, and not to the better either. The 14" wheels are a 45mm offset, the 15" wheels are 40mm offset, and the NC Wheels are a 55mm offset.

Click for article on wheel offset: <http://www.miata.net/garage/offset.htm>

The third important criteria is the weight of the wheel itself. This is called "Unsprung weight", as the springs are above the wheels, and do not support the wheels and tires. The suspension in the Miata you own is designed to control the weight of the tire and wheel it came from the factory with. The heavier you go with the wheel and tire combination, the more trouble the suspension will have keeping the tire against the road surface on a rough or bumpy road. When you are considering a change, weigh the tire and wheel off of your car, and try not to end up more than one or two pounds heavier. Lighter is even better! You can find the weights of tires you are considering on the Tire Rack web page, and you can follow the link below for weights of some of the wheels on the NA and NB year Miatas. In addition note the NC, 16" wheel is 15 pounds, and the NC, 17" wheel is 17.3 pounds.

Wheel Weights http://www.miata.net/faq/wheel_weights.html

Wheel weight can effect performance of the car also, so please let me explain. When you push down on the gas pedal, the engine has to turn the rear wheels to make the car go forward. Do you remember as a kid ever turning your bicycle upside down and spinning the wheels by hand? Do you remember how easy it was to start the wheel spinning? Have you ever had your car up on a jack and turned a front wheel by hand? The car tire takes more effort to start it turning than the bicycle tire did. The point I am trying to make is that the lighter the wheel & tire, the less horsepower it takes to actually start turning the wheel, and then more is left to be used to push the car forward. I have read where adding one pound of wheel weight is like putting 10 pounds of lead in the trunk in relation to acceleration. Or removing one pound of wheel weight is like removing 10 pounds of lead. The 4 wheels I just put on my car are about 2.5 pounds each lighter than the factory wheels. So this 10 pounds lighter unsprung weight is equal in performance to taking 100 pounds of weight out of my car. This give faster acceleration and a feeling of more pep as faster throttle response.

Remember to also take into consideration the weight of the tire when making a change. Going to a smaller wheel may weigh less, but the tire needed to fit it may weigh more because of the wider sidewall. The combined weight of the wheel and tire is what you need to be sure of.

As I have done things to my Miata, I have never had the mindset of turning it into a race car, but I just wanted to get a little bit "extra" where I could without sacrificing my driveability or comfort. So with a little thought, planning, and remembering the points above, you can make your Miata more "your own", and possibly even help it perform better!

