



Tech Notes

911 REAR SUSPENSION BASICS. NEW TORSION BARS. NEW SPRING PLATES.
STORY AND PHOTOS BY ERIC SHEA

If you've ever thought about changing your rear spring rate, read on. In this article I'll cover the basics of upgrading or repairing a 911 rear suspension, specifically, the rear torsion bars. This can be a handy procedure for those looking to upgrade to a stiffer set of bars for a racing application or for those needing to replace a broken bar. I'll also cover the installation of adjustable spring plates as well.

Most 911 spring plates are adjustable and I don't recommend replacing them, however, if you're a owner of an very early 911 (pre 73) chances are, your spring plates are fixed and you might benefit from adjustable units. You have two choices here, a) factory adjustable plates and b) Sway-a-Way brand. The Sway-a-Way brand allows you to fine-tune your ride height with a simple turn of an allen head screw. The factory plates need a thin 30mm wrench.

The first order of the day is to raise your car up and place it on jack stands. I use the outside edges of the torsion bar tubes to place the jack stands on for stability. Next you'll

need to remove your rear wheels and tires... if I've lost you, then maybe you'll get a kick out of the Oktoberfest article. If you've gotten this far then you probably have the mechanical wherewithal to finish the job. Finally, you'll want to remove the body plugs. These have to come off to slide your existing torsion bars out of their tube. If you've always wondered what those round plugs just before the rear wheel opening on a 911 are for... now you know.

OK, I lied... the first order of the day, as with any job worth doing, is the prep. My prep began with a little reading. I read the factory manual, the Haynes manual and the instruction sheet that came with the Sway-a-Way spring plates. They all pointed to a fairly simple procedure. The factory manual deviated from the others by utilizing a special tool (of course) to relieve the tension on the spring plate. A task easily accomplished with the floor jack you used to raise the car in the first place. I wish I had a garage full of those "special factory tools".

Next I prepped the bushings and the torsion bars so there wouldn't be any surprises in the fit and finish department when I got to the installing part. Some of my bushings slipped right on and a few others were a little too tight. To prep the bushings I used "Special Tool # "P11/2PVC220" (better known as a 1 1/2 piece of PVC pipe with some 220 emory cloth wrapped around it). In reading through the Sway-a-Way instructions I noticed a section discussing the fact that "some Porsche torsion bars may not fit". They emphatically stated "do not hammer these on, simply take (the same) emory cloth and remove .002 off the splined end of the torsion bar. One of my bars slid in on command, the other needed some time with the emory cloth. I also found it handy to clean up the splines with a triangle file. After about 1/2 hour of "massaging" it slipped right in.

Note: Be extremely careful with the paint on your torsion bars. This protective coating is there to prevent rust. If rust begins in your torsion bar, it can escalate to a stress fracture and eventually total failure. If you're

interested in this procedure because you have a broken torsion bar, this is no doubt what has happened to you. If you notice a chip in the paint touch it up immediately. I use POR15. This is a rust inhibitive paint with identical properties of the factory finish.

On with the show. Now that the car is up on jack stands and a good deal of prep work is done, it's time to start removing suspension components. Place the jack under the control arm to take the load off the shock absorber. Remove the 19mm shock bolt. Next remove the 4, 19mm bolts holding the spring plate to the control arm. There's one pesky 19mm bolt behind the rear caliper that's challenging to get to. Finally, there's 4, 17mm bolts holding the spring plate cover in place. Remove those but watch for spring tension on the final bolt. The spring plate can snap back toward the body of the car. Make sure your hands are clear of that area. Pry the cover off using a large screwdriver. This can have varying degrees of difficulty depending upon the age of the vehicle. Water seeps in between the cover and the large rubber bushing causing rust. The rust deforms the inside of the plate and the rubber bushing as the two wear. They came off and I took the cover to the bead blasting cabinet... no luck, they were too rusty. New ones were in order.

Now is the time to take measurements on your original spring plate angle. There are a couple of ways to do this. You can simply scribe the angle on the side of the car with the tip of your screwdriver. This works if you're using the same spring rate and simply replacing the spring plates. If you're moving up to a larger spring, this angle will change. I used a \$5 magnetic angle calculator from



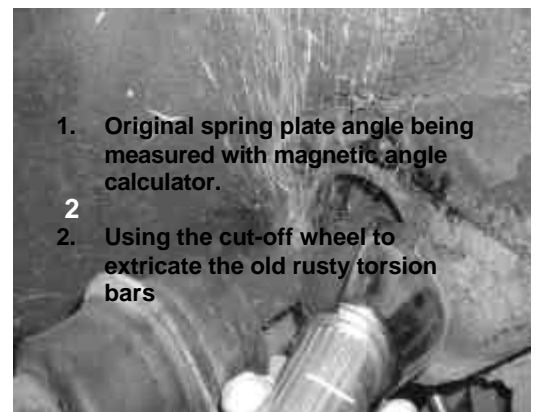
Ride height "before" the adjustable spring plates and Turbo torsion bars.

Harbor Freight and Tools. Thom Fitzpatrick, who has a wonderful web site called "vintagebus.com" has a handy spring rate calculator located on his site. You'll need to enter the weight of your vehicle and the torsion bar size you'll be using. Tom's already calculated the ride height and weight distribution using European ride height and basic 911 ratios. I went from stock 23mm torsion bars to 26mm factory Turbo torsion bars. This will help prevent "squat" from the added weight and power of the new engine. My old angle measured 30 degrees. At 2143 pounds and using the 26mm bars my new angle calculates to 24-25 degrees. Here's the site address for the calculator:

<http://www.vintagebus.com/cgi-bin/spring.cgi>

Next they say to remove the spring plate by prying back and forth with two screwdrivers. And yes, it's

"basically" that simple. Again, the age of the car dictates the relative manner of ease in which this task is performed. I needed my MAP Torch along with the two screwdrivers. There are two large rubber bushings at work here; the one we discussed on the cover side (outside) and the other on the body side. Rust had made its way into this area as well so mine were reluctant to slide right out. By heating the inside bushing around the edges it started to slide out, torsion bar and all. Which spells out my next dilemma...The old torsion bars were rusted to the spring plate splines. After many attempts at removal I went the (relatively) easy



1. Original spring plate angle being measured with magnetic angle calculator.
2. Using the cut-off wheel to extricate the old rusty torsion bars

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notch (9 degrees) in the opposite direction you can effectively fine-tune the angle by one degree each time.

Once you've got your angle where you think it should be it's time to bolt it all back together. Install the outer bushing with more Moly-Graphite grease and put it on the spring plate. Set the cover plate back on and start the upper left-hand bolt and the two right-hand bolts. Tighten the bolts just enough so the cap is a snug fit. For the final bolt you'll need to use the jack to raise the spring plate until you see the lower left bolt hole in the cover. Insert the fourth bolt and then tighten all four bolts to 25-ft. lb. This step may take a little patience, as you'll be working against your new bushings. Finish reinstalling the bolts and put the wheels back on. Set the car back down and take a short test drive to "set" the suspension. Make any final adjustments and then have your car realigned at a qualified shop.

route (if you call cutting through hardened steel bars easy). I used a cutoff wheel, which still took about 15 minutes each bar.

Done. The removal process is now behind us. It's time to begin installing shiny new components. Not just yet... a little more prep work remains. The bushing surface on the car needs to be cleaned up. There was quite a bit of rust in there. I used a die grinder and a flat rounded bit. Then the bushings needed to be prepped for the hole. The bushings I used are designed oversize and need to be sized to fit the hole. I used a belt sander to bring the bushing down to the perfect size for a tight fit.

Next install the new torsion bars. They simply slide into place. You'll need to coat the bars with a thin layer of grease to prevent any future rust build up. I used a rag in the access hole to protect both the bar and the paint on the body. The bars slide right through these outer holes into the torsion bar tube. Don't worry about spline positioning just yet. Slide the bars in until you feel them engage with the splines mounted in the body.

With liberal amounts of Moly-Graphite grease it's time to slide the bushing and the spring plate into it's new

home. As the spring plate begins to engage the torsion bar it's time to think about that angle we discussed previously. Matching the angle desired is the tricky (yet simple) part. You can try moving from spline to spline on the outer edged of the torsion bar. Each notch will move the angle by 8 degrees. By moving the "inside" splines of the torsion bar one

I wish I could say "It's that simple" but... as you can see, this can get quite involved. On a difficulty scale of 10, I'd give it a 45 depending upon the age of your vehicle. Dig in.

