

Leo's Z3 Newsletter

Episode 4 from Leo's Z3 Corner: *Zee Bushings*

The gritty details are messy, (to work on), dark (way up under there) and usually crumbly(worn, tired and ineffective)! *If* you liked the improvements with lighter wheels and tires, better braking with the improved ceramic carbon fiber brakes, and a plucky and supple ride over the bumps and holes again with the progressive rate springs and Bilstein gas shocks crafted for our Z3's, then, there is this! **Zee Bushings**: The absolute best way to tighten up your steering response, road manners, lane stability, cornering and on center feel probably better than from the show room 20 years ago, in my opinion.

The Most Common Worn Bushings Symptoms

Typical tell-tale signs of worn bushings under a vehicle include the [following symptoms](#):

- The vehicle makes rattling noises when driven over rough roads.
- The vehicle sounds as though it is clunking when you make sharp turns, accelerate hard or hit the brakes.
- The vehicle feels as though it is trembling along the front portion as well as swaying from the rear.
- The steering seems more difficult to handle or maintain. (Gripping the steering wheel all the time?)
- The steering feels looser than before causing a vague wandering within your lane especially with crowned roads.

The bushings in a vehicle could be compared to the cartilage in the human body. Whereas cartilage protects against joint stress by preventing bone-to-bone contact, bushings safeguard metal joints from stress by preventing metal-to-metal contact. However, just as cartilage can wear down in a body as an individual ages, so too can bushings wear out in a vehicle.

One of the more damaging possibilities of worn bushings is when the problem affects the *control arms* of the vehicle.

So what do we have in the remedy department?? Modern technology provides poly Bushes and skilled labor to the rescue of course! Zee below fellow Z3 ers!!

The schematics and trouble shooting charts are from the BMW Z3 Service Manual for 1996-2002, by Bentley publishers.

Anyone in the club can contact me to reference this book.

Review the *troubleshooting of your suspension* issues first. My car had multiple indicators for replacement so I did the complete job!! In the reference, they clearly mention the rear suspension bushings, rear trailing arm bushings, rear differential bushings, rear sub frame bushings and the Front control arm bushings. The FRONT control arm bushings are much easier to replace and I found that the middle and outer ball joints of the control ARM still fine at doing their jobs (no slop!) but NOT the control arm BUSHING!! See the diagrams and see what Turner Motor Sports offers (lollipop replacement!) for the street!

There are also links to the PowerFlex Bushings for our specific application. They can be sourced from Powerflex direct or my favorite, Turner MS. They will give free shipping and probably, if you ask, a package discount when you get all the pieces.

Zee Stuff! Learn about the high tech product developments and successful applications across the BMW models and specifically, the Z3's from Powerflex.

<https://www.powerflexusa.com/shop/category/bmw-1022>

<https://www.powerflexusa.com/shop/category/bmw-z-series-1344>

<https://www.powerflexusa.com/shop/category/bmw-z-series-z3-1994-2002-1823>

<https://www.powerflexusa.com/shop/product/pfr5-306-bmw-e30-z3-e21-e36-5-2002-rear-trailing-arm-bushing-2492>

<https://www.powerflexusa.com/shop/product/pfr5-300-bmw-z3-e30-3-series-318ti-rear-diff-bushing-2013>

<https://www.powerflexusa.com/shop/product/pfr5-311-bmw-z3-e36-318ti-rear-beam-bushing-2015>

<https://www.turnermotorsport.com/p-397529-turner-centered-polyurethane-front-control-arm-bushing-80a-pre-installed-in-brackets/>

WHO's Skilled enough to put it all in???

Well not surprisingly, the dealership in Ocala was willing to do it for me with the parts I provided but I wasn't happy with the installed price or the delay in getting the tools. So being resourceful, I looked around and PatRicks Auto Service in Ocala, near the dealer, that did an incredible job at a fraction of the cost meeting my deadline. The dealer wants to use all their factory extraction tools to get the old stuff out of there. The old brittle rubber came out more easily than they thought with no use of heat to melt them out. The new poly ones are *precision fits* and are **not** pressed in. It's not rocket science and the expert mechanics at PatRicks have all the shop references for all the tightening torques, know which nuts or bolts are not reusable and a handy array of tools and experience to get the job done quickly and expertly. No squeaks, rattles or realignment needed! Give Kyle at PatRick Auto service an email with

your request. Service4Patricksauto@gmail.com for outstanding customer service!

It is a big deal to do it all but the results were worth every penny to me. Remember that this information is no substitute for your final analysis of what to do with your Z3. Questions and comments to ljbrancatojr@gmail.com

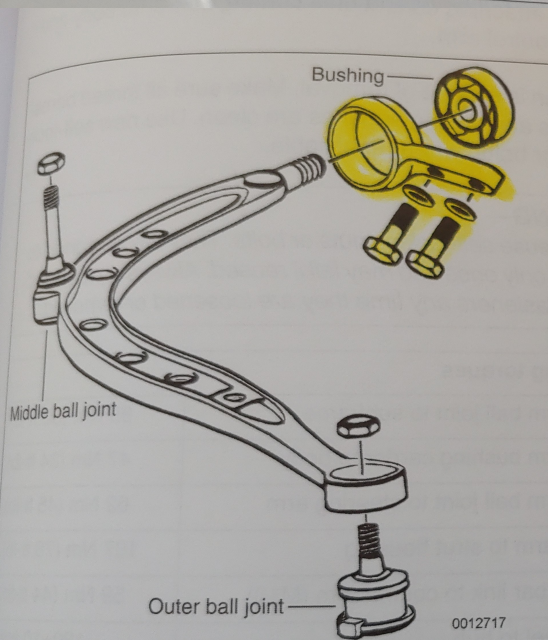
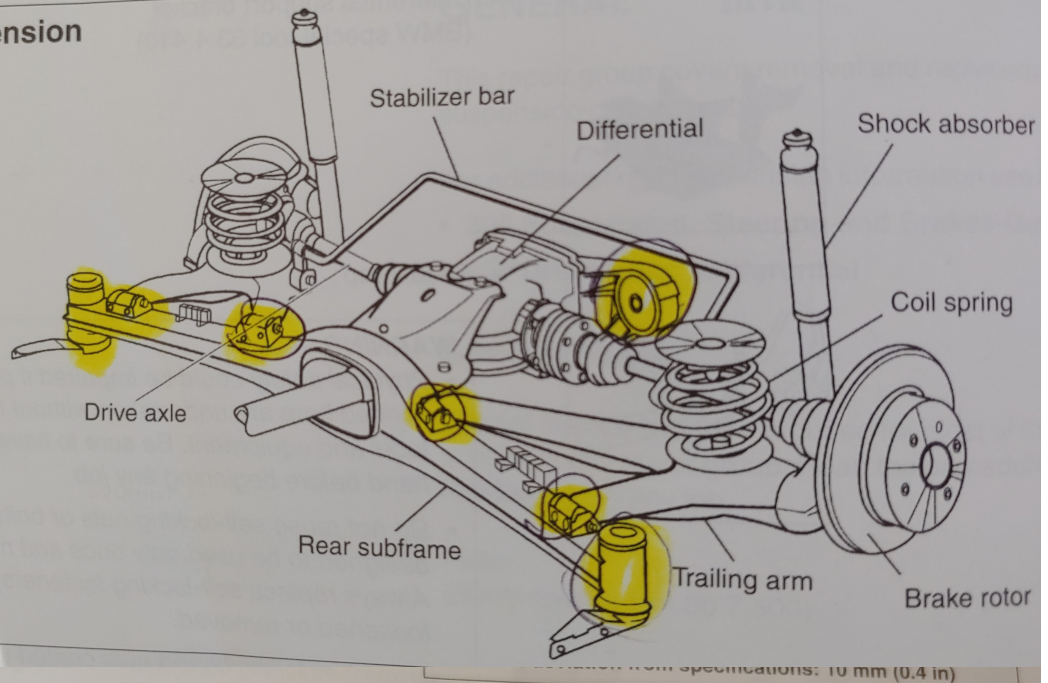
300-12 Suspension, Steering and Brakes—General

Table a. Suspension and steering troubleshooting		Repairs (repair groups shown in bold)
Symptom	Probable cause	
Poor handling, poor directional stability	Rear trailing arm or rear subframe bushings worn or damaged Rear alignment incorrect Worn struts or shock absorbers	Replace / replace rear suspension bushings. 330 Check and adjust wheel alignment. 320 Replace struts or shock absorbers. 310, 330
Poor stability, repeated bouncing after bumps, suspension bottoms out easily	Rear trailing arm bushing worn or damaged	Replace trailing arm bushing. 330
Rear end hop with hard braking	Worn upper strut mounts Incorrect tire pressure Power steering system faulty Incorrect tire pressure	Replace strut mounts. 310 Check and correct tire pressures. 020 Check power steering fluid level. 320 Check and correct tire pressures. 020
Steering heavy, poor return-to-center	Loose steering rack mounting bolt(s) Worn tie rod end(s) Faulty front wheel bearing Worn or damaged steering rack	Inspect and tighten bolts. 320 Replace tie rod(s) and align wheels. 320 Replace wheel bearing. 310 Adjust or replace steering rack. 320
Steering loose, imprecise	Worn tires Worn front upper strut mounts Worn suspension bushings (control arm or trailing arm) Worn stabilizer bar rubber mounts Loose suspension subframe	Replace tires. Replace upper strut mounts. 310 Replace worn bushings. 310, 330
Suspension noise, especially over bumps (drumming, rattling)	Rear trailing arm front bushing worn or damaged Worn struts or shock absorbers Incorrect coil springs Bent or damaged suspension components Sagging coil springs	Replace stabilizer bar rubber mounts. 310, 330 Check subframe for damage. Tighten mounting bolts. Replace trailing arm bushing. 330 Replace struts or shock absorbers. 310, 330 Measure ride height. 300 Inspect, repair / replace as necessary. 310, 330
Tail skid when braking	Rear trailing arm front bushing worn or damaged Worn struts or shock absorbers Incorrect coil springs Sagging coil springs	Replace trailing arm bushing. 330 Replace struts or shock absorbers. 310, 330 Measure ride height. 300 Inspect, repair / replace as necessary. 310, 330
Tire flat spots Uneven ride height	Rear trailing arm front bushing worn or damaged Worn struts or shock absorbers Incorrect coil springs Sagging coil springs	Replace trailing arm bushing. 330 Replace struts or shock absorbers. 310, 330 Measure ride height. 300 Inspect, repair / replace as necessary. 310, 330
Unsteady in curves, self-steering, poor rear end stability	Rear subframe bushings worn or damaged Differential bushings worn or damaged Rear shock absorbers worn Worn wheel bearing	Check / replace rear suspension bushings Check / replace rear differential bushings. 331 Replace rear shock absorbers. 330 Replace wheel bearing. 310, 330
Wheel noise, continuous growling, may be more noticeable when turning Wheel-hop on normal road surface	Worn wheel bearing Worn struts or shock absorbers	Replace rear shock absorbers. 330 Replace wheel bearing. 310, 330 Replace struts or shock absorbers. 310, 330



330-4 Rear Suspension

Z3 rear suspension



FRONT CONTROL ARMS

◀ The outer mounting bushing and the outer ball joint on the control arm are available as replacement parts. If the control arm middle ball joint is worn, replace the complete control arm.

★ Special press tools are required to remove the control arm and to replace the control arm bushing. Read the procedure through before beginning the job.

NOT THE CASE WITH COMPLETE ASSEMBLY FROM TURNERS. QUICKER & BETTER!

Control arm, removing and installing


- Raise car and remove wheel.

WARNING —

Make sure car is stable and well supported at all times. Us

where applicable test and repair procedures can be found

Table a. Suspension and steering troubleshooting

Symptom	Probable cause	Repairs (repair groups shown in bold)
Breaking away while braking	Worn struts or shock absorbers	Replace struts or shock absorbers. 310, 330
Car pulls to one side, wanders	Incorrect tire pressure	Check and correct tire pressures. 020
	Incorrect wheel alignment	Check and adjust wheel alignment. 320
	Faulty brakes (pulls only when braking)	Check for sticking / damaged front caliper. 340
Front end or rear end vibration or shimmy 	Worn struts or shock absorbers	Replace struts or shock absorbers. 310, 330
	Worn suspension bushings (control arm or trailing arm)	Replace worn bushings. 310, 330
	Worn front suspension ball joints (control arm, steering arm or steering tie-rod end)	Replace worn ball joints. 310
	Unbalanced or bent wheels / tire	Balance tires. Check tires for uneven wear patterns. Check wheels for damage.
	Loose wheel lug bolts	Tighten lug bolts to proper torque.