1984 to 1989 300ZX (Z31) Rear Camber Modification

Gary Molitor, March 1, 2009

Step 1: Bushing Removal

After removal of the rear suspension and disassembly of all the parts, the first thing I did was remove all the old rubber bushings.

This was easily done by heating either end of the inner sleeve with a MAP gas torch until the rubber starts to flare up and soften. The inner sleeve were pushed out with a punch.

I did the same thing to the larger rubber bushing in each of the swing arm housings. I used a long artists' palette knife to work around the edges which made removal easier. This method produces a bit of stinky smoke which meant I had to do it in a well ventilated area.

I used a rotary flapper wheel in a die grinder on the inside of the bearing housings to remove any residual rubber.

The inner sleeves were cleaned using a stiff wire wheel on a right angle grinder.

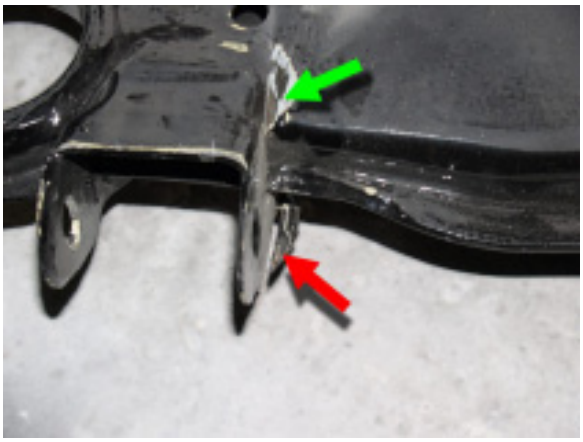
I measured all the sleeves and found the outer sleeves were smaller than the inner ones. All sleeves must be the same size. I ordered two of the larger inner sleeves, part number 55045-01P10.

Step 2: Camber plate assembly

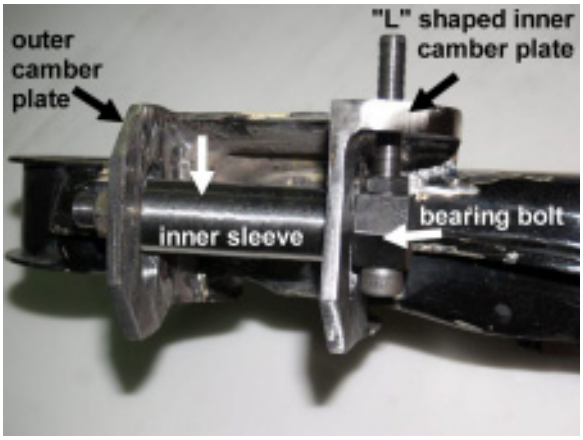
I welded the camber plate and parts together as shown in the photo below.

Step 3: Welding Camber Plates to the Subframe

I removed the paint from the areas on the subframe member where welding was to be done using a stiff wire wheel on a right angle grinder. On of the areas is indicated by the green arrow seen below. Then using a 4½" cutoff wheel on a right angle grinder, I cut off the area indicated by the red arrow.



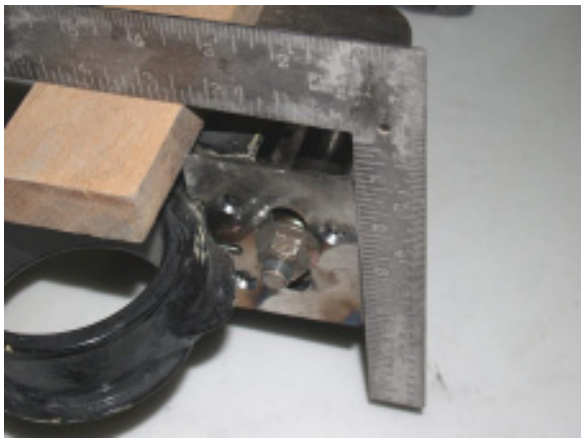
Holding the inner “L” shaped plate to the out side face of the inner swing arm mount, I lined up one of the inner sleeves and inserted the bearing retaining bolt through the hole and though the sleeve. Then placed the outer camber plate on to the outside



mount and threaded a 12mm x 1.25 nut on to the bolt and tightened just enough to allow squaring of the plates. The 3/8" - 24 NC socket head screw was inserted through the hole in the bearing retaining bolt and screwed into the hole located in the thick end of the “L” plate. The bolt was adjusted to its highest point so that the upper portion of the oval slot was touching the bolt.

I needed a simple method to insure the plates were perpendicular and quare to the subframe. I used two clean and true boards, a narrow (3/4" x 1" x 18") one placed on top of the subframe and a wider (3/4" x 2-3/8" x 18") one to clear the subframe swing arm mountings. I secured the boards in place using two large spring loaded clamps.

I placed a square on the top board to square and align the outer edge of each camber plate. When I had the plates square, I tightened the nut and bolt and check for square again.



The wood was removed and the parts were tack welded. The bolt and sleeve were removed and welding was completed. This process was repeated for the other side.

I made some small filler pieces to fill in areas on the stock mounts in order to present a cleaner installation.

At this point, I sent out the four inner sleeves to be cut to length in such a way as to retain the serrated and beveled ends per the dimensions seen in the drawing on the following page.

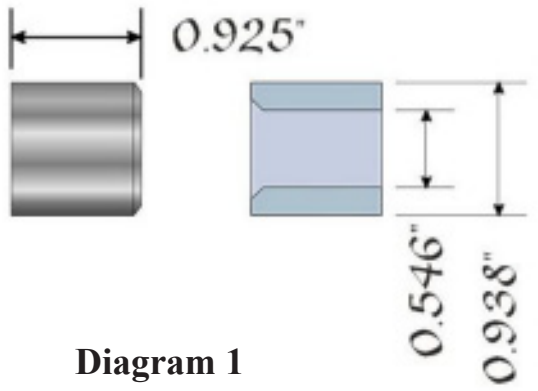


Diagram 1

I drilled a ½" hole through the original stock mounts at the bottom of the ½" oval slot in the new plates. Then cut the excess material away with a narrow metal cutting blade in a reciprocating saw and evened out the surface with a carbide bit in a die grinder. This will allow full movement of the bearing retaining bolt for camber adjustment. This is illustrated in the following two pictures.

Step 4: Swing Arm Modification

The difficulty of this process is dependent on the tools and resources that are available. Inside the bearing housing ends are sleeves that were pressed in during manufacturing. These sleeves must be removed. It was my decision to have them pressed out. The first shop I went to could not get the swing arm in to the press due to its odd shape. The second shop I went to had a fully adjustable press. They told me they'd have no problem pressing the sleeves out. The proper way to press the sleeves out is to machine a slug to the correct diameter of the inside of the outer bearing housing. This diameter is difficult to determine for two reasons. One, the bearing housings are not perfectly cylindrical in circumference. They warped during the welded process at the time of manufacturing. Secondly, the inner sleeve impairs any attempt to make and accurate measurement. Any measurement is at best a guess. My choice in shops did a poor job and scared the inside of the bearing housing as seen in the picture below.

This left me with a tedious and time consuming job of cleaning up the inside surfaces with hand rotary grinding and sanding tools show below.

Possibly a better way to remove these inner sleeves is to make two linear cuts opposite each other the length of the bearing sleeve with a hack saw or a reciprocating saw. Once the cuts are made, the sleeves can be removed by tapping them out with a punch. The inside surface may be marred when doing the cutting. This should not be a problem as some finishing work will have to be done to the inside surfaces of each of the bearing housings.

Prior to honing and to allow for a smother fit, I polished the outside surface of the retainers, as pictured below, using a bench

grinder. This could also be done in a lathe.

It took me about twenty minutes of honing per bearing housing to get the bearing retainers to fit. When the bearing retainers were made, the maximum ID measurement of the large outer sleeve was used to anticipating the honing process. The honing tools I used included a 1" inch course sanding drum (1/4" mandrel) and a 1" medium grit flap wheel (1/4" mandrel), in a 1/4" die grinder. When the retainer is inserted into the bearing housing, the fit should be tight, but not so tight as to have to drive it in or out of the housing with a hammer. Final fitting was accomplished by

painting the outside surface of the retainer with wide felt marker (Sharpie). When an obstruction was encountered, the ink was rubbed off from the retainer indicating the area in the bearing housing that requires additional honing. A Craftsman 1" or 7/8" (1/2" drive) sockets were just the right size to lightly tap the bearing retainers in an out of the bearing housing during fitting.

Important note: I found that if the retainer is too tight, pressure is put on the spherical bearing causing the bearing to bind.

Step 5: Aligning the Bearing in the Bearing Housings.

I assembled the bearing and retainer into the housing so that the center of the bearing's outer race was at the center of the housing. This placement is demonstrated in **Diagram 2**. I used my depth caliper to adjust the retainers so that they measured the same depth from either side of the housing.

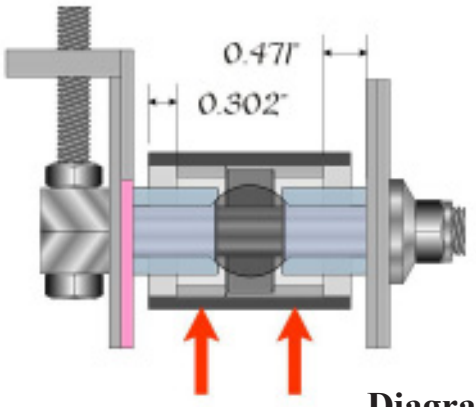
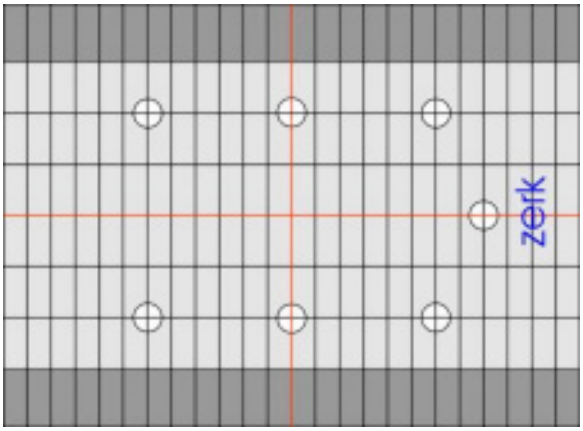
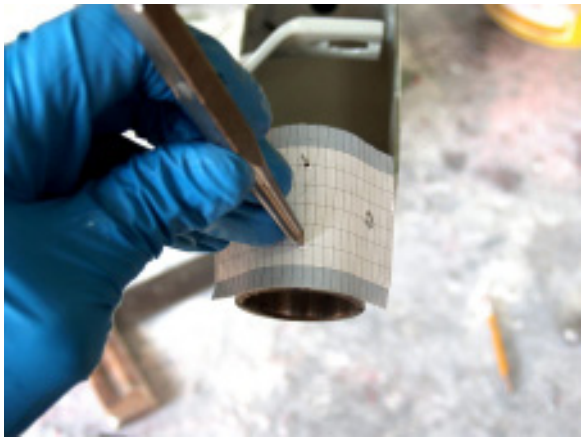


Diagram 2

I installed the cut two half inner sleeves per bearing into the housing using a 2" long 3/8" rod to center and hold the inner sleeves in place. Once the swing arm was in the subframe housing mount, I inserted the bolt to push the 3/8" rod out and lightly tighten the nut. I again double check the open space between the housing and the subframe mount to insure that the open space is the same on either side of the subframe mount.



I made self adhesive templates (shown above) which I applied to each of the swing arm bearing housings as seen the lower picture. Then center punched all the designated points on the template. The marks on the template indicate where the retainer set screws and Zerk fitting will be placed. Using a number 21 drill bit, I drilled two holes, one each for the inner and outer bearing retainer. This is indicated by the red arrows in **Diagram 2**. I drilled all the way through each retainer noting not to drill into the center where the



bearing is located. This procedure was repeated for each housing.

I removed the swing arms and numbered each of the four bearing housings. Then removed each set of bearings and retainers and mark the retainers to indicate which housing they came from. Without identifying which set of retainers belonged to which housing, I would not be able to match up the set screw holes during reassembly. I create a spanner notch in the outer surface of each of the retainers, as shown in the picture below and made a spanner will facilitate proper alignment of the set screw holes

With each of the swing arms firmly held in a bench vise, I inserted

the retainers without the spherical bearings into each of the housings and used my shop made spanner to match the holes.

I completed drilling the set screw holes with the #21 bit being very careful not to break the bit while drilling. I tapped all the # 21 bit holes with a 10-32 tap. Because these taps can easily be

broken if one is not extremely careful, I bought 3 of them. If one of the taps breaks above the hole, it can removed with vise grips. However, if the tap breaks off inside the hole, removal will be extremely difficult. To prevent this I went slowly, cutting 1/8 a turn and back off 1/2 a turn while using lots of cutting oil.

The Zerk fitting required a #3 (7/32") bit and a 1/4"-28 NF tap. These can be found in the a drill and tap kit. I drilled the grease fitting hole all the way through the retainer so the grease can penetrate in to the bearing.

Step 6: Trimming the excess housing material

I removed all the retainers and cleaned up the burrs inside the housings and retainers that were left over from drilling the holes using one of my rotary flap wheels. I then cut off about a ¼" from

each side of the swing arm bearing housings using a reciprocating saw as seen above. I finished the rough cut to square with a 4½" flap sanding disk on a right angle grinder insuring not to remove more than 0.300".

The last change to the subframe was to create a ¾" to 1" notch in the plate on the lower side of the inner housing retainers as shown below. This notch allows access for a grease gun to the Zerk fitting.

Step 7: Finished

All that is left to do is paint the parts and reinstall the rear suspension.

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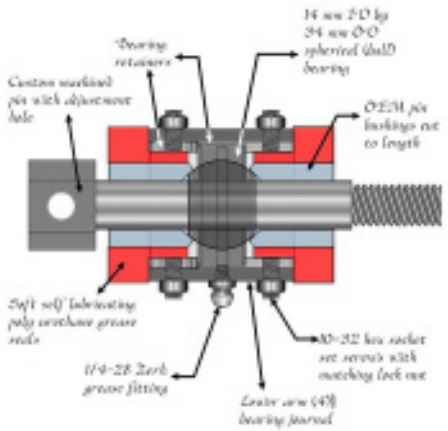

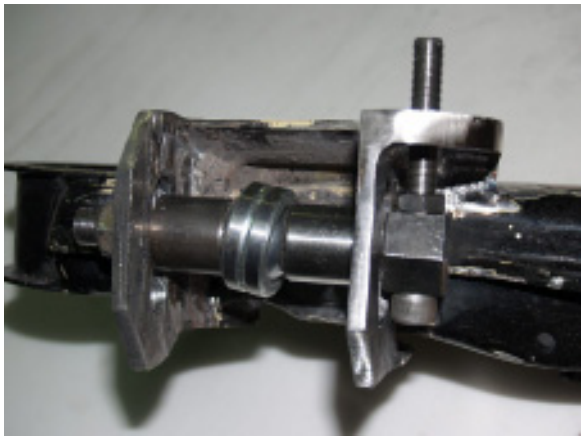

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