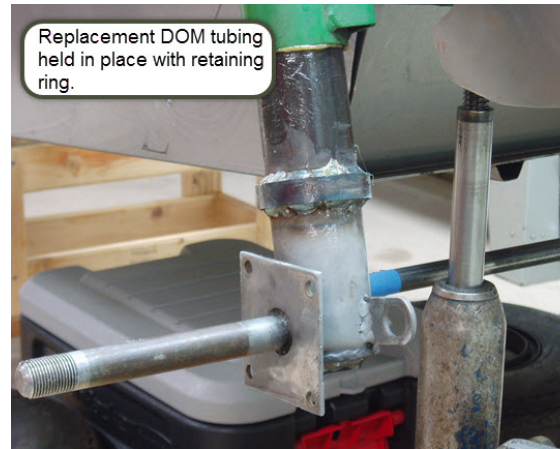


## SHOP NOTES King Midget Maintenance and Restoration

### I-30 Shock Upgrade *by Randy Chesnutt*

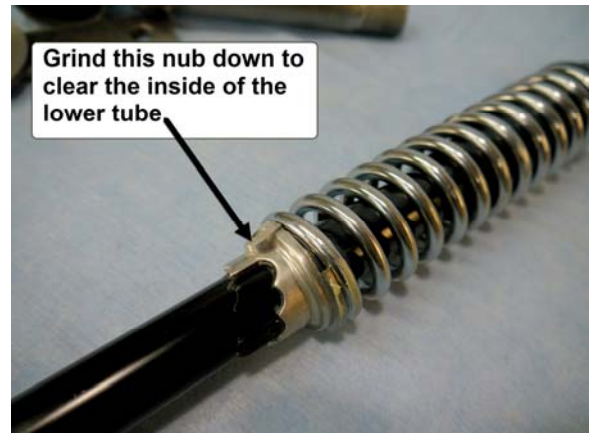
I have a Model 2 built from a salvaged frame. The lower steering tubes were worn and bent beyond repair and the left one was frozen inside the upper tube. To unfreeze the lower tube required heating with an acetylene torch and forcing it out with a hammer. A friend gave me his Model 3 lower tubes which had  $\frac{3}{4}$  inch spindles, springs and worn tubes. This got me on the road but the tubes were so worn out that they wouldn't provide any damping and the steering would shimmy.

I tried to make improvements by replacing about two-thirds of the lower tubes with 2 inch OD DOM tubing using a retaining collar. This modification didn't help improve damping but did eliminate about 80 percent of the steering shimmy. I also added a damping shock to the center steering link that may have reduced the shimmy another 5 or 10 percent. I also replaced the steering sector gear and pinion with a new unit that I made which includes a method of adjusting gear backlash. The car is drivable but hitting any kind of bump the springs could bottom out and for sure I'd bounce down the road like a hopping bunny. Shimmy was always possible and torque steering was real bad. I drove the car for a couple of years in this condition and I did OK. However, knowing how the car handled, letting someone else drive the car was a bad idea.



I've thought many times that installing automotive shocks with an adjustable spring might be the solution to my steering problems. However, finding the right specifications was beyond me. Whatever I chose had to be the right length, weight, compression length, spring diameter etc. I'm just a hobby guy and buying a bunch of shocks and telling a mechanic to handle it isn't going to happen. So I kicked the can down the road hoping something magical would happen. Magic did happen not too long ago when Gary Rathburn advertised his dad's M3 which, among other things, included a modification to add shocks to the front steering tubes. I sent Gary an email asking if he knew the model number of the shocks that his dad had used? He did; Azusa part no. 1700-246. However, he wasn't aware of what modification his dad had made to install the shocks. So I had a starting point but the rest of the task was up to me.

Without going into a lot of detail I elected to buy the Azusa 1700-15 mechanical adjustable shocks, 450 lbs, 2 inch compression with  $\frac{3}{8}$  inch mounting hole. I purchased mine from MFG Supply for a total cost of \$52.97. I also decided to clean up the lower tubes I had already modified. Removing the springs for this project meant cutting the spindle out and re-welding it in. The lower tube metal stock I purchased was from Onlinemetals. What I ordered was DOM mild steel tube A513 Type 5, OD 2 inch, Wall 0.109 inch and ID 1.782. For a 24 inch length the total cost was \$44.14.



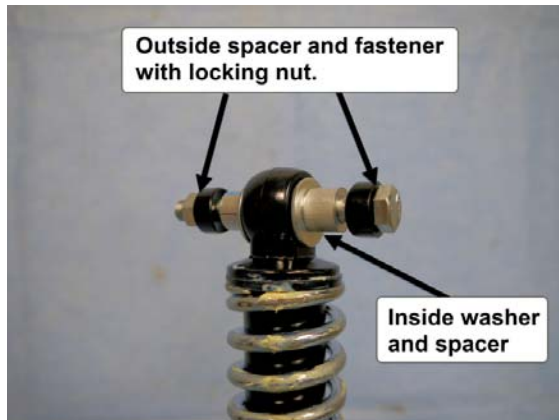
## I. Steering

## SHOP NOTES King Midget Maintenance and Restoration

The shocks slipped into the DOM tubes with maybe a few thousands to spare after grinding down the protruding metal nub. I used a brake cylinder hone to smooth the bore of the tubing. I applied a liberal amount of grease, slipped the shock in the bore and the fit was perfect. No binding or rubbing, so I'm happy.

My next task was to determine the measurements for drilling the shock attachment holes in the upper and lower tubes. To figure this out I used Autodesk's Fusion 360 CAD software to make a scale drawing of the upper and lower tubes with the shock inside the tube's bore. I now had the hole measurements and the drawings to make a new lower tube assembly (1 inch spindle using the new 2 inch DOM tube). When the modification was completed it was time to do some initial testing.

What I learned from my testing was to add an inside spacer and washer on both sides of the shock bracket grommet to keep it from being pushed out of the bracket.



How did I get the two washers and spacers in? I made a dowel pin to hold the parts together as I slipped them into the shock tube. When aligned with the attachment holes I pushed a bolt thru the hole, which pushed the dowel pin out the other side.

My next concern was when in use, the lower tube would be traveling up and down as it bounced down the road unprotected from the outside elements. A solution, which isn't the best, was to cut the top of a pair of socks off and use a wire clamping tool to attach them as best I could to the upper and lower tubes. I've accumulated about 10 hours of driving time to date and so far the wire clamp and socks are working OK. To make your own wiring clamping tool search "Hose Clamp Tool" on YouTube and you will find many different DIY videos of making and using such a clamping tool.



I have several hours of driving time over various kinds of road condition and I'm really enjoying this modification. Also, for my application adjusting the coil to the lowest tension has proven to be a good setting for my M2. No bunny hopping or steering shimmying. The King Midget feels much safer to drive and the project was worth the effort.

To see more pictures and learn how I installed the inside spacers and washers go to my website: <https://www.SnuttsWorkShop.com> and click on *Shock Upgrade*. ■

### I. Steering