

## Rear Girling Shock Absorber Renewal

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This spring I renewed the rear Girling shock absorbers on my MG TD. I share my notes, in case they may be of interest to others:

Problem: The rubber bushings in the shock absorber assemblies were badly deteriorated. One shock link became detached from its associated rubber bushing, which was the catalyst for undertaking this project.

I spoke with Lazar at Apple Hydraulics ([www.applehydraulics.com](http://www.applehydraulics.com)). He suggested that if the Girling shock absorbers were working properly it was best not to open them. Proper operation of the Girlings is indicated by the ability to move the shock absorber arm smoothly from one extreme position to the other. When pressing against the arm, the arm should move slowly. The shock arms should maintain the position in which they are last placed. My Girlings operated as described, so I did not open them up or send them out for rebuilding.

I found two sources for the rubber bushings (two bushings required per Girling shock absorber assembly). Moss Motors ([www.mossmotors.com](http://www.mossmotors.com)) is one source (part number 282-710, \$5.15 per bushing). Another is Apple Hydraulics (\$3.75 per bushing). The Moss bushings are an extremely hard rubber, shaped like a doughnut, and approximately 5/8" thick. The thickness is only approximately half that of the socket in which it is to be inserted. The diameter of the Moss bushing is 1.03". The Apple bushings are also a hard rubber, although seemingly not quite so hard as the Moss bushings. The Apple bushings are of a size to fill the entire socket. The diameter of the Apple bushing is 0.95". Although I purchased both Moss and Apple bushings, I used the Apple bushings. (If interested, I can e-mail a picture comparing the two different bushings.)

Using wire brushes mounted in my drill press I removed flaking and deteriorated paint from the shock absorber components. A hand operated 3/4" wire brush does an excellent job of cleaning inside the socket where the rubber bushings are fitted. (These brushes are used in plumbing applications to clean 3/4" copper pipe fittings and are readily available.) I used the POR15 paint system (Marine Clean, Metal Ready, and POR15 semi-gloss chassis black) on all parts ([www.por15.com](http://www.por15.com)). Do not paint the 1" in length metal surfaces that will contact the rubber bushings. I found that POR15, in particular, produces a sufficiently slippery surface that there is a tendency for the rubber bushing assemblies to separate while on the road if the contact surfaces are painted with POR15. (The problem of the rubber bushing assemblies coming apart is also discussed in the TD-TF archives.)

Trial and error led me to a modification of the shock link and stud that appears to prevent them from being pushed out of the rubber bushings. As previously described, the portions of these parts that wind up inside the rubber bushing were not painted. I used a Dremel composite cutoff wheel chucked in my drill press and, holding the parts by hand, grooved a total of four circles along the 1" unpainted metal. Although not measured, the grooves were approximately 1/16" deep. I treated the exposed metal surfaces with Metal Ready, which both etches the metal and prevents the metal surface from rusting. As a result of these modifications the portion of the shock link and stud inside the rubber bushing is held much more tenaciously from slipping out of the bushing, resulting from the increased surface area from the Metal Ready treatment and the rubber deforming into the circular depressions.

Although I had use of a Moss bushing installation kit, I made some of my own tools to facilitate the installation of the rubber bushings. In particular, I found that the Moss "pilot" (used to guide the suspension component into the rubber bushing) at 5/8" is sufficiently large as to be difficult to use. (The pilot looks like a bullet.) I fabricated my own pilot from 1/2" aluminum rod stock. I used a piece of scrap 2x4 wood to make a cradle for the shock link in which the rubber bushing would be placed. Make sure to leave room for the pilot when it clears the rubber bushing. (Picture available.) A drill press was used to press parts into place.

**Note added later: Sockets from a socket set can be substituted for some of the specialized Moss tools and used in conjunction with the drill press to facilitate the removal and installation of the rubber bushings.**

To facilitate the installation of the rubber bushing in the socket, I "lubricated" the inside of the socket and the rubber bushing with clear GE silicone caulk. I learned from other projects that uncured silicone caulk is exceedingly slippery. The rubber bushings were easy to install in the metal socket using the Moss installation kit. In fact, the bushing position could be easily fine-tuned after installation. The cured silicone caulk provided a small degree of lubricity even after curing. Any excess, exposed silicone caulk is easy to rub off. I did not want to use silicone caulk as the lubricant on the inside of the rubber bushing to minimize the chance the inserted piece could be pushed out. I used mineral spirits (paint thinner) instead. It was a greatly inferior lubricant, but evaporated completely after use.

Although I do not have many miles on the TD since completing the shock absorber renewal, everything seems to be holding well. My thanks to Evan Ford, who helped me from afar with this project.

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This is a follow-up to my posting on 19 July 2004. One of the shock links I installed popped out of the lower bush. I was not completely surprised, however, as the silicone caulk I used to lubricate the bush during link installation continued to provide a fairly slippery surface, even after the caulk set. I was able to displace the link in the bush with finger pressure, and not a heck of a lot, either. Also, I had not scored circles around the lower pin (stud) to help resist sideways motion in the bush, as I did on the driver's side.

\* I used a Dremel cutoff wheel chucked in my drill press to score approximately four or five circles around the lower pin where it rides in the bush. The last circle was placed as close to the end of the pin as possible, to accommodate a spring steel "E" clip. The "E" clip is anodized black, of similar diameter to the rubber bush, and rather inconspicuous when mounted. I view the "E" clip as added insurance, but I am not sure that it is really needed.

\* I used uncured butyl rubber as my lubricant, so that when cured it would provide good frictional characteristics between the rubber bush and the "ribbed" link or pin. (The butyl rubber is used to seal rubber roof sections. I purchased it in a construction supply store some time ago for a roofing project-what else. It comes in a standard caulk tube, is called "RBP Roofing System Lap Sealant LST-1." The ingredients are Mineral Spirits, Carbon black, Butyl rubber compound, and Polyisobutylene.)

After the butyl rubber cured, I could not displace the pin or link in the bushing as was the case with silicone caulk. The assembly has now been tested for many miles and many different road conditions. Unlike before, the links have remained firmly bedded in the rubber bushes.

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Although others have described the use of a cotter pin, I wasn't sure there was room for both a cotter pin and a backing washer, as I would want to do. The black "E" clip was a way to keep the space requirements to a minimum and make a modification that was largely inconspicuous.

I think what really solved the problem was the combination of circles (grooves) cut in the link and stud, etching the metal for improved frictional characteristics, and the uncured butyl rubber roofing sealant. I am curious to know if others have good luck with this method.

Original bushings



Apple Hydraulic bushings  
0.953 inches



Moss bushings  
1.030 inches



Special Note: Experience has shown that Steps 2 & 3 are made much easier if you allow the bushing to dry in place for a few hours before attempting to press the stud or link into the new bushing.

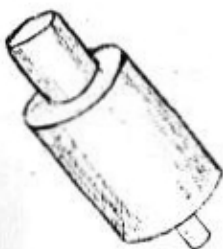
## SHOCK ABSORBER LINK BUSHING INSTALLATION TOOL KIT

For many years, TC & TD owners have suffered loose and/or lost shock absorber links due to the shock arms and links being bushed incorrectly. Replacement bushings resembling (in many cases, actually made from) short pieces of heater hose were relatively easy to install. They looked as though they should work, but there was not enough pressure on the rubber to keep them located. As a temporary fix, links and studs were often drilled and washers fitted, held in place by split pins. This stopped the parts from separating, but the bushing material was still not doing the job originally intended.

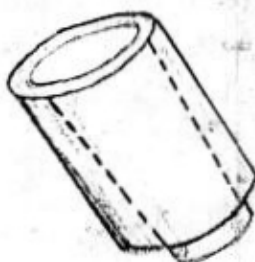
Now, the correct bushings are once again available but they are so short and fat, nobody believes they are correct for the intended application! However, they were made to the exact dimensions and from the same grade of rubber as those originally fitted when Girling shocks were state of the art. The only problem is that they are virtually impossible to install without the use of special installation tools ... which is the reason for the development of this tool kit.

The kit contains four pieces... Driver, Guide, Pilot and Base. These pieces are used in combination to install original-style bushings in both the shock absorber arm and the shock link, and then to properly locate the link mounting stud in the link and the link in the shock absorber arm.

DRIVER



GUIDE



PILOT



BASE



The easiest way to use these tools is in conjunction with a drill press and a second pair of hands to help hold and align the parts. This method will be described here. In the event that you cannot obtain access to a drill press, the tools can be used with a large bench vise to squeeze the parts together. With either method, special care is needed when pressing the link through the bush in the shock arm, as the link will try to cock sideways.

IMPORTANT Use water or liquid detergent as a lubricant for ease of installation. However, note that the bushing will move in the eye - and the shock link in the bushed eye - until the lubricating medium has dried. If you can allow 24hrs. between installing the bushings and pressing in the link or stud, the bushings will be less likely to move around.

**Step 1: INSTALLING THE BUSHING IN THE EYE OF A LINK OR AN ARM.**

Insert the longer end of the Driver in the drill chuck. Set the Base on the table of the drill press, about 3.5" beneath the Driver. Position the eye of the link or shock arm on the Base, with the raised lip of the Base inside the eye. IMPORTANT NOTE: IT IS IMPERATIVE THAT ALL TRACES OF THE OLD BUSHING, PAINT, DIRT, ETC., BE REMOVED FROM THE EYE. HONE THE EYE WITH A SMALL BRAKE CYLINDER HONE OR SAND WITH EMERY CLOTH TO ENSURE THAT THE SURFACE IS SMOOTH AND CLEAN.

Place the Guide on top of the eye with its step inside the eye. Take a new bushing, wet its outside surface with lubricant, then place it in the top of the tapered Guide. Lower the drill press so that the tip of the Driver centers in the bushing, then continue pressing until the bushing pushes out of the Guide. It should now be centered in the eye, an even distance from each end.

**Step 2: INSTALLING THE STUD IN A BUSHED LINK.**

Remove the Driver from the drill chuck, and close the jaws of the chuck. Fit the Pilot over the end of the stud. Liberally lubricate the Pilot taper. With the link positioned over the Base, still on the drill press table, point the Pilot into the center of the bushing and lower the drill press so that the chuck presses on the threaded end of the stud. Hold the link tightly so that it cannot be squeezed up off the Base, while you continue to lower the chuck. When the stud is properly positioned, the Pilot will drop off into the Base. IMPORTANT NOTE: BE SURE YOU ARE PRESSING THE STUD INTO THE LINK FROM THE CORRECT SIDE, RELATIVE TO THE BENT END OF THE LINK! THE STUD MUST ALSO BE CLEAN AND SMOOTH.

**Step 3: INSTALLING THE LINK INTO THE SHOCK ARM.**

Open the chuck so that you have as wide and flat a pressing surface as possible. Position the bushed shock arm over the Base, fit the Pilot onto the end of the link and lubricate liberally. Aim the Pilot into the center of the bushing and position the link so that the drill chuck bears down on it just behind the bend. Maintain an upward pressure on the eye end of the link while pressing down with the drill press. This will help prevent the pilot from entering the bushing at an angle. Continue pressing until the link has passed all the way into the bushing and the Pilot has dropped off into the Base. IMPORTANT NOTE: ONCE AGAIN, BE SURE THAT YOU ARE PRESSING THE LINK INTO THE CORRECT SIDE OF THE SHOCK ARM. Until the lubricant has dried, the link will turn in the bushing, enabling it to be aligned correctly. However, do not drive the car until the lubricant has dried (allow 24 hours as a rule).



