

TC Rear Axle Tower Repair

(And how to keep it from failing in the first place)



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TC Motoring Guild
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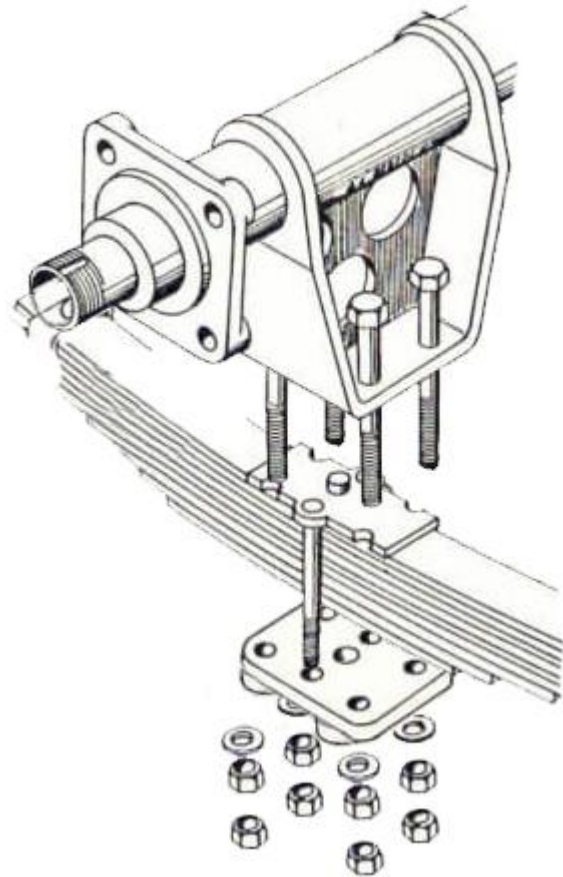
PART ONE: CAUSE AND EFFECT

The TC rear axle employs a different mounting design than other M.G. models. Rather than utilizing U-bolts which wrap around the axle and springs as most cars have, a welded steel tower is fixed to the axle housing and the bottom plate is bolted directly to the spring assembly.

This makes for a very rigid mounting, but 75 years of acceleration and braking forces being concentrated at this union can fatigue the tower and eventually cause it to fail. When that happens, the car falls onto the tire, locking it up, and everything comes skidding (literally) to a halt. The ensuing mechanical carnage can be widespread, potentially damaging or destroying the tire, wheel arch, axle shaft and differential, as well as shattering nerves.

Several TCMG members have reported tower failures in the past decade. The title photo of this article is Pete and Fran Thelander's car which failed at speed in 2016. Two others failed in the following 12 months.

Moving beyond the years of stress and corrosion, other contributing factors to tower failures include loose mounting bolts, rough roads and hard or abusive driving habits. Once cracks begin to form, the damage accelerates as the forces transmitted to the tower through torque and leaf spring movements continue to flex and stress the affected areas. Therefore regular inspection is an important step toward preventing failure.

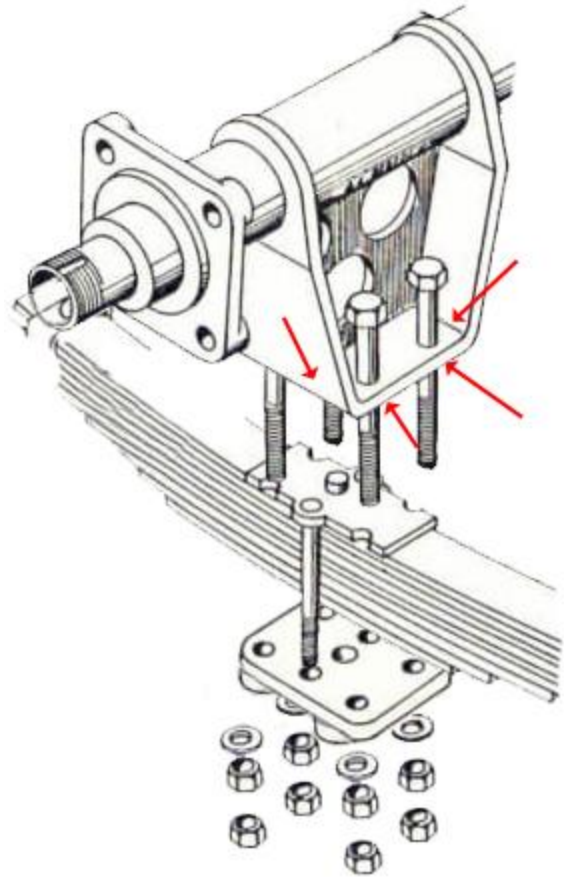


TC Rear Axle Tower Assembly

PART TWO: INSPECTION AND REPAIR

Since the entire weight of the car is hanging on these towers, it is advisable to inspect the assembly annually for loose hardware, stress cracks or splits in the metal.

All areas of the tower should be inspected, but our primary area of focus is the bottom plate. Areas of greatest concern are along the sections where the bottom curves up to the sides, which may show evidence of stress or surface cracking, and the bolt holes which usually crack between the hole itself and the closest edge. Loose mounting bolts can exaggerate these cracks because once the spring / tower union is loose, twisting forces are concentrated around the bolt heads instead of being spread out over a larger area. Make the tower and mounting bolts part of your annual safety inspection!



Red arrows are marking areas of greatest stress.

To begin inspection, clean all grease, oil and road grime from the area to aid in spotting issues. It is not uncommon for cracks to be hidden by paint as well. The accompanying image below shows one of six cracked bolt holes found on TC9849/EXU that was not visible until a thick layer of paint was removed.



Cracked tower bolt hole. Note how the metal has separated.

Once all trouble spots have been identified, it's time to get out the welding gear. Axle towers with minor cracks can be welded and returned to service. If there is evidence of additional fatigue along the edges of the bottom plate then the tower should be deemed unsafe and undergo further repair and reinforcement as outlined in the next section.



Welding cracked bolt holes. Keep a fire extinguisher handy.



The above bolt hole, repaired.

PART THREE: REINFORCEMENT MODIFICATIONS

Note: While many axles can be quickly welded and returned to the road, the author recommends the following reinforcement on all axles to minimize the possibility of a dangerous failure down the road.

The design of the TC axle towers is adequate for the car, but was never intended to be in service for so many decades. Even if a tower passes visual inspection, there is no guarantee that there aren't internal flaws which may cause a failure at some point. The following modification will help reduce the chance of this happening and give some peace of mind while driving your TC.

The first step is to thoroughly clean the area to ensure a good surface to weld on. With all existing cracks repaired, a steel gusset is formed to fit snugly into the bottom of the tower. The exact size of the gusset is probably not important, but it should extend well above the highest stress areas near the bottom plate. One gusset is installed on each side of each tower, so four gussets in total.



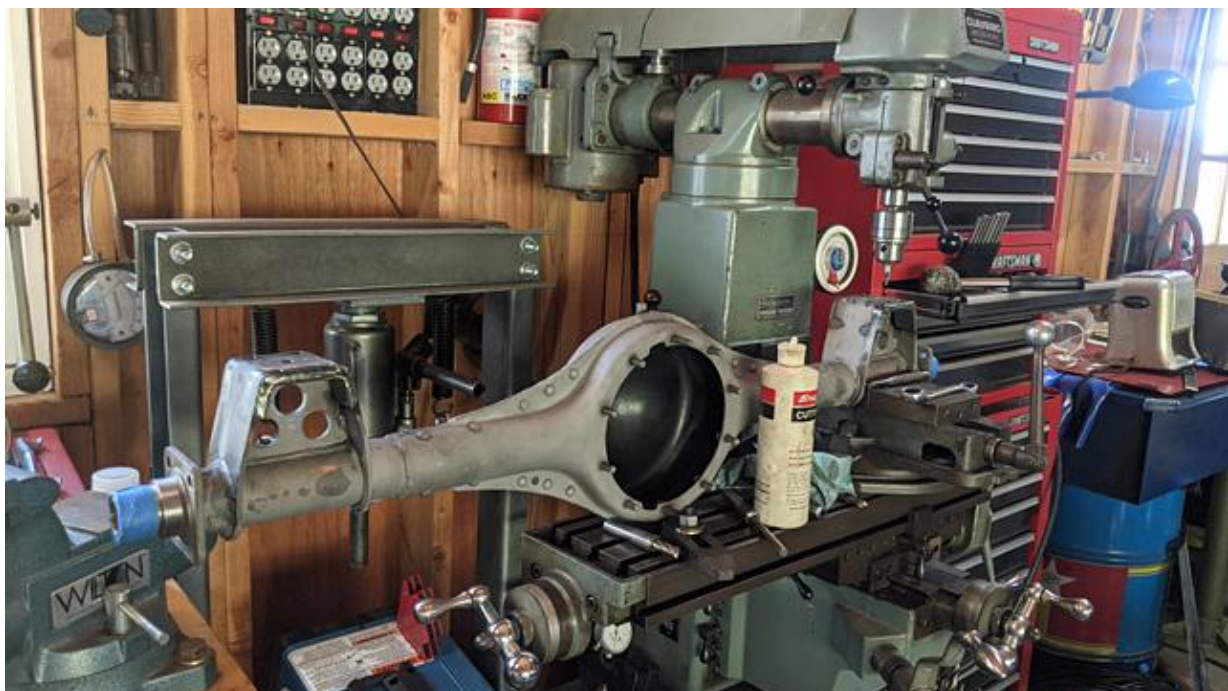
One of four gussets welded in place.

A professional welder can do this job in a day at nominal cost. The above photo shows one of four gussets fabricated and installed at a shop near the author for \$160 USD. Bring photos to show them exactly what needs to be done.

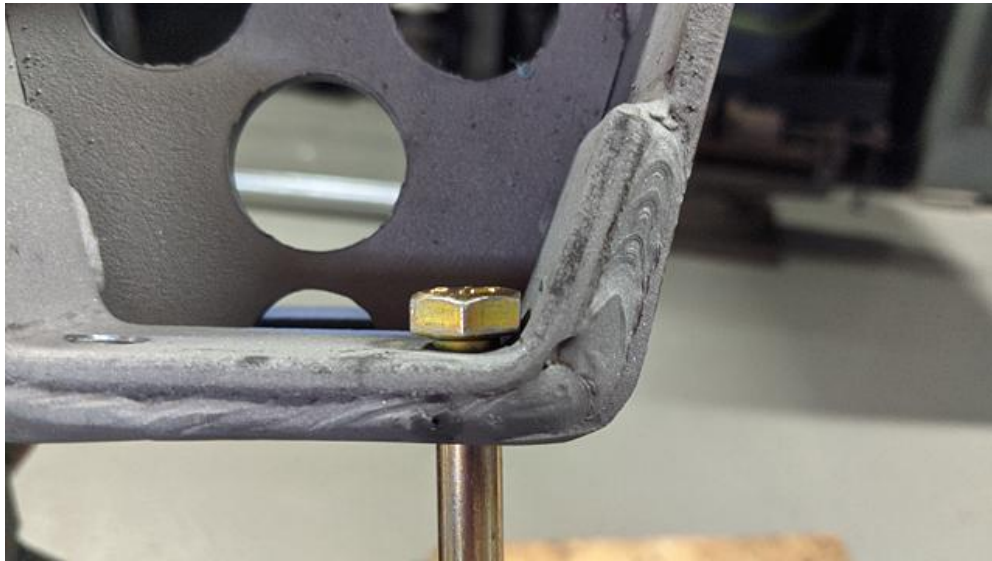
The next step is to drill new bolt holes. The old holes can be used as a guide. These should be drilled as precisely as possible to ensure the bolts line up with the holes in the leaf spring plates. It is also important to fit the gusset as snugly against the sides of the tower as possible. If the bottom corner is too relaxed, or the gusset is too narrow, the bolt heads will foul the sides and additional grinding or machining will be necessary.

With careful drilling this job can probably be done by hand, but it is best done on a drill press or milling machine. Mount the axle securely and ensure the plate is level in both directions. One trick to lining up the holes is to put a piece of 5/16" rod in the drill head and adjust until it enters the hole perfectly. Then swap it out for a drill bit and drill the hole. Repeat for each additional hole.

The author used a centering punch to dimple the center of each hole, then drilled a pilot hole, and then the final size. Wash, rinse, repeat until you have eight perfect holes.



Here we see what happens when one of the gussets was a little short. The slight gap is not a problem for the strength of the gusset, but it presents a problem when you put the bolts in.



Below is after careful grinding to give the bolt head clearance. The surface should be as flat as possible to give the bolt head even support. If you feel you ground it a little too far, you can possibly use a D washer under the head.



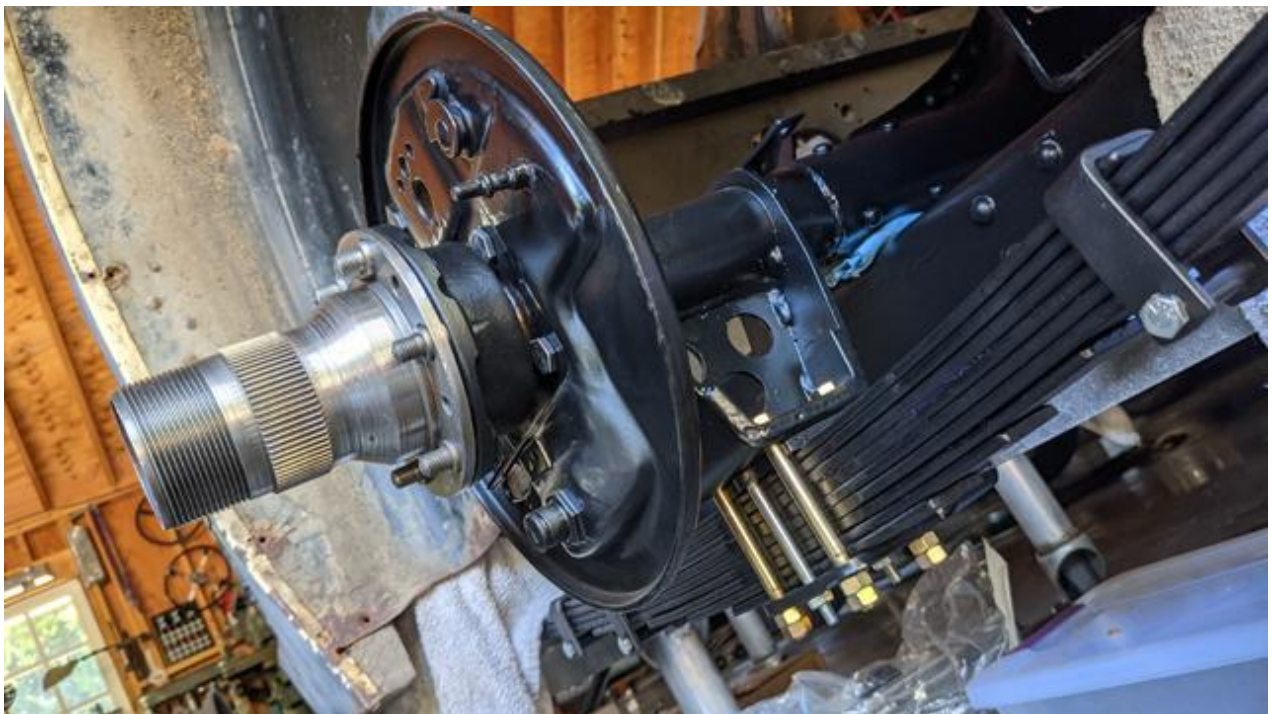
You might ask, why not put the gusset underneath instead? The reason is that this would affect the ride height of the car. There are better and less permanent ways to lower your TC!

PART FOUR: PUTTING IT ALL TOGETHER

After painting with something durable, it's time to mount the axle back onto the springs. Original style hardware is available from several sources, but you will need to source longer than standard bolts. For those who aren't concerned about strict originality, you can purchase high-strength hardware from your manufacturer of choice.

The author is mistrusting of today's corner hardware store offerings, having far too easily broken bolts that are supposed to be of a particular grade, so an order from a reputable supplier was made. Bolt sizes are 5/16"-24 x 3.5" in length. Double nut the bottom with jam nuts of equal strength.

With everything back together, you should now have a rear axle assembly that will never leave the car on its own accord!



PART FIVE: BIGGER PROBLEMS

If your axle has suffered a total failure like the one in the title photo then you're beyond the point of a simple gusset. The lower plate will need to be completely replaced. Here we see a further modification by Pete Thelander where not only was the lower plate replaced with new metal, but it was also extended to reduce the strain on the very thin metal between the bolt holes and edges.



The next image shows a previous owner's very poor attempt at re-attaching a broken lower plate on Linda Simmons' TC7018, using welds that resemble Elmer's glue.



When replacing the bottom plate, it is VERY IMPORTANT to ensure that the towers are exactly the same height and sitting perfectly level to each other, or the car will not sit level and the springs may be subjected to additional stress. It is probably not necessary to cut and replace the opposite side unless there is evidence of impending failure, but reinforcing gussets would be a good idea.

Safety Fast!

Questions, comments or corrections on this article can be sent to the author.



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