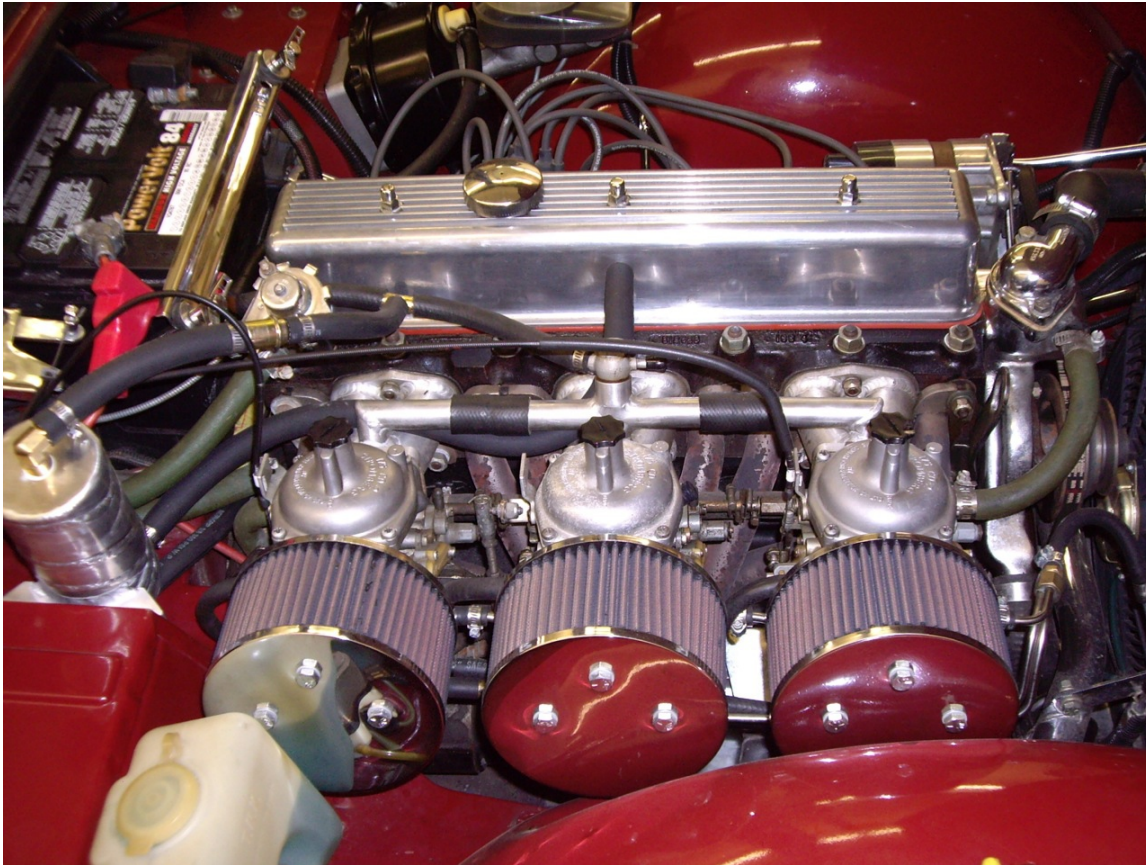


## Differential, Suspension and Brake Upgrades on my TR6 by Dennis Billo

Until last year I owned a very nice Triumph TR6 that I had purchased from a guy in Red Deer, AB. He had done a fairly comprehensive restoration of the car and had done some engine upgrades at the same time. He had also chromed a lot of parts in the engine bay and front suspension.

The work done to the rebuilt engine consisted of installing a higher performance 'road cam', a set of headers leading to twin exhausts, and modifying the valves and seats for running unleaded fuel. Finally, the most visible thing when opening the bonnet was the triple Zenith Stromberg carb set-up.



The engine ran strongly. The only things I did was to remove all the original emission system equipment (that did nothing to restrict pollutants anyway). I installed K & N filters and an oil separator to prevent excess oil passing through the carburetors from the PCV valve. (it's the small round tank on the extreme left side of the photo above).

The rest of the powertrain, suspension and braking systems were stock. My early impressions when driving the car were certainly not pleasant. The car sat too high on it's skinny old tires, the brakes were just barely adequate, the suspension was mushy and the power band of the re-worked engine did not match the rest of the powertrain. The engine was unhappy running at anything under 2200 rpm with its' new cam. Sadly, legal speeds in overdrive had the car turning over 2000 rpm and standing starts were sluggish until the revs hit 2500- 3000 rpm.

I lived with it but I had developed ideas as to what I would like to do to improve the car. My decision was made for me when a rear wheel hub bearing started to fail on one of the club's summer drives to BC. The vibration started in Revelstoke and I made it home but I was planning the revisions all the way back. The car certainly was not stock as it was so I really had no qualms about "going down that road".

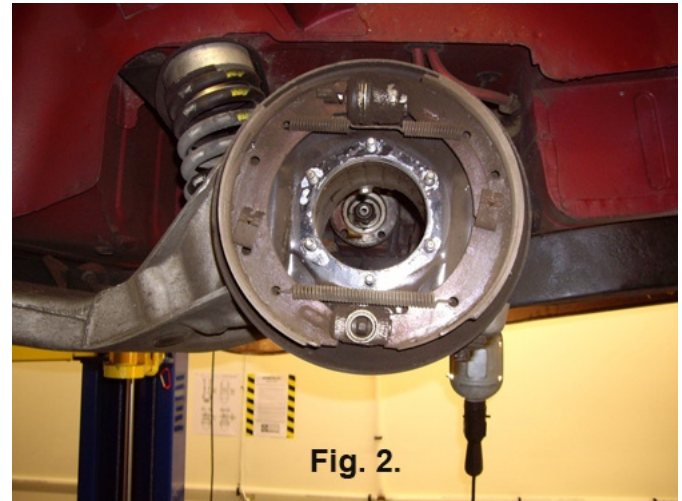
Although I would have liked to replace the stock 4 speed and OD setup with a 5 speed gearbox, the reality was that it all was working well and I couldn't justify the cost for the limited benefits. So I decided to limit the upgrades to the differential, suspension, brakes and tires.

I opted to swap the stock diff. for a Nissan R200 viscous limited slip model sporting 4:08 gears. These units were used in the 300 ZX non turbo models and handled 266 HP so they can take anything a TR6 can throw at it. The higher numerical gear ratio would raise my rpms on the highway and give me more power at the bottom end.

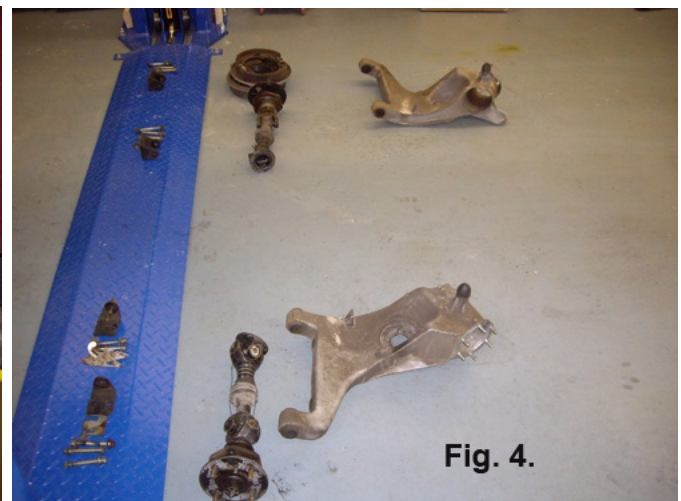
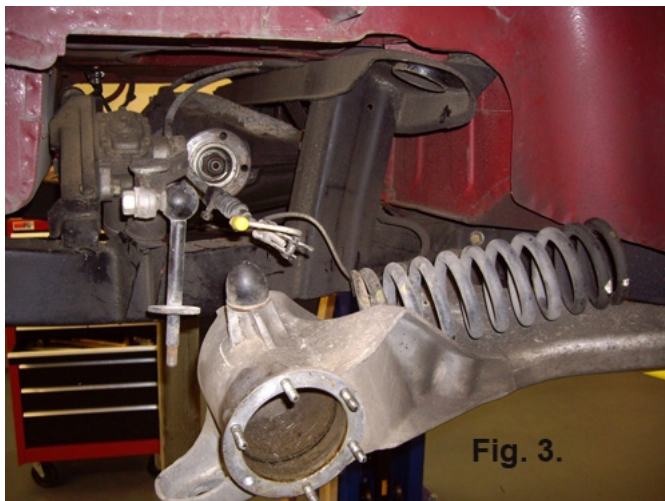
I sourced the diff. and mounting kit from GoodParts (<http://www.goodparts.com/>). They specialize in Triumph upgrades and in fact the triple carb set-up was one of their goodies. Browsing their website like a kid in a candy store I couldn't resist buying their beautiful CV joint axles and fully adjustable trailing arm brackets!

Here is a short description of the work I did:

The exchange is fairly straightforward especially if you are working from a hoist. After removing the wheels , back off the brake shoe adjusters and remove the drums (**Fig. 1**). As removal of the axles can be done through the hub housing, simply remove the four bolts attaching the axles to the diff. and after removing the hub retaining bolts the entire unit can be pulled through the trailing



arm hub opening. Because there is a chance that the two halves of the axle can separate at the spline I ran a piece of wire through the two universals to prevent that from happening (**Fig. 2 & 4**)





(Note: If one was only replacing the diff. and re-using the stock axles everything else could be left in place. As I was upgrading everything a complete disassembly was required.)

Continue by removing the brake shoes and backing plate. I checked the wheel cylinders for leaks or bad seals (kits are available). I ordered new, higher quality shoes and I had the drums turned. The trailing arm can then be removed. This is accomplished by jacking up under the trailing arm to compress the coil spring, removing the nut on the lever arm shock link and then lowering the jack slowly (**Fig. 3**). I had my stock shocks rebuilt by Apple Hydraulics (<http://www.applehydraulics.com/shocks.htm>) opting for a 15% stiffer action. I debated going to a tube shock conversion but the good set-ups required a complicated installation and the easy ones mount at a compromised angle IMHO.

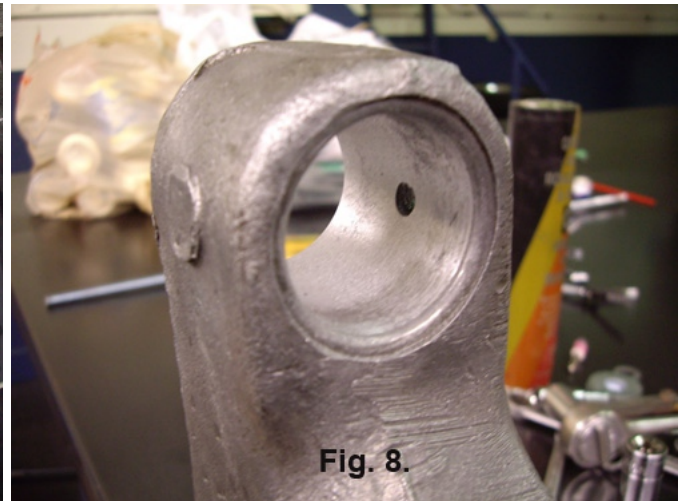
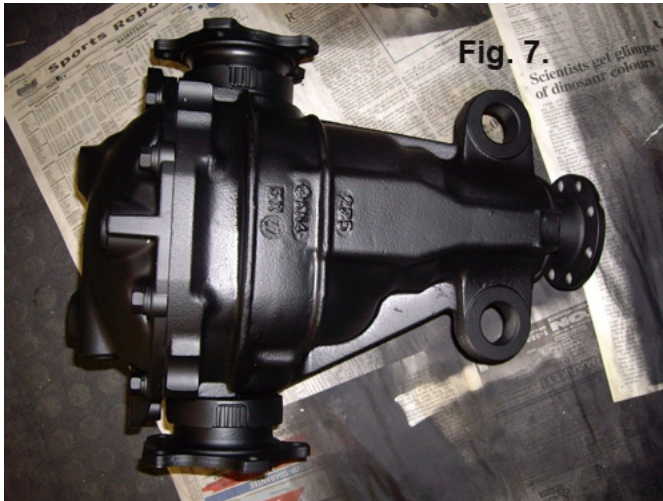
When removing the front brackets holding the trailing arms to the frame be sure to save all shims and keep the two sides separate for re-assembly. I replaced this “made in hell system” with GoodParts’ adjustable brackets. (you will thank me if you use these). Check the frame for soundness.



Once both sides have been removed (**Fig. 4**) you are ready to remove the diff. itself. I had removed the rear part of the exhaust system previously as I was adding front and rear torsion bars necessitating a re-routing of the exhaust. The drive shaft has to be completely removed as it has to be shortened by 2 inches. The bolts at the front end are a bear to take out and even worse to re-install and torque properly. This is where I learned many new words! The driveshaft work can be done locally for about \$100. The only thing holding the diff. in place now are four large nuts (**Fig. 5**).

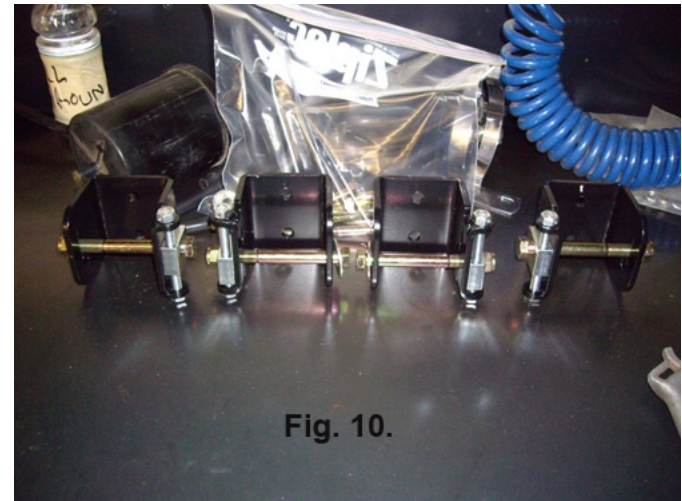
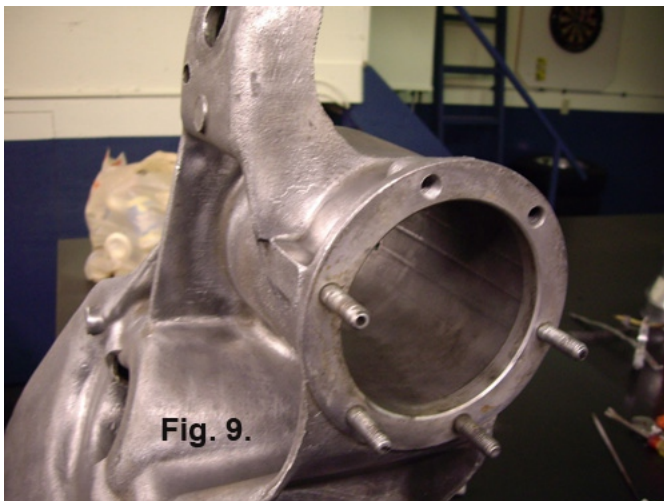
Use a transmission jack or similar to lower the diff. out of the car. The four mounting studs are welded to frame mounted brackets which are prone to cracking. Check them carefully and repair as required. Moss and others sell gusset kits that can be welded in to strengthen this weak point. Mine were in good condition (**Fig. 6**).

Re-install the shortened driveshaft to the transmission end. Following the instructions that come with the Nissan diff. mounting kit, install the diff. with the new brackets and hardware and re-attach the driveshaft. The diff. came unpainted so I did that first (**Fig. 7**). Rotate the shaft to make sure the U-joint does not strike the housing it passes through. I had to slightly bend the metal to provide the proper clearance.



The next step is to re-build the trailing arms and replace the bushings. I replaced the old bushings with high quality Nylatron units. These must have a proper fit to work as intended and after cleaning the bores I had to hone them a bit to get a good fit. I also drilled holes in the four housings so I could install grease zerks to prevent squeaking (**Fig. 8**)

The hub mounting bolts should also be checked, replacing broken or damaged bolts or nuts (**Fig. 9**). Once everything is clean the installation of the trailing arms can begin.

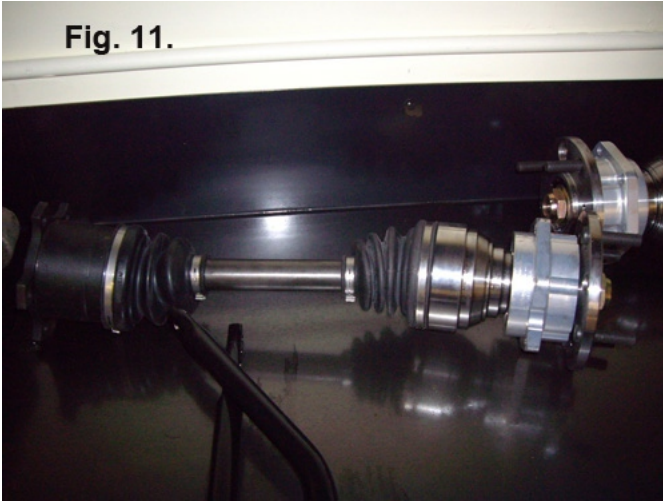


**Fig. 10** shows the new adjustable trailing arm to frame mounting brackets. These can be tightened to the frame as any alignment can be made at the adjusters once everything is in place. Please note that the shims taken out at disassembly are no longer needed.

I wanted to lower the car about an inch at all four corners so I ordered new competition springs that were 1" shorter than stock. If I have one regret it is that these springs turned out to be too stiff for normal touring, especially given the torsion bars do an admirable job of improving cornering ability and minimizing body roll.



**Fig. 11.**



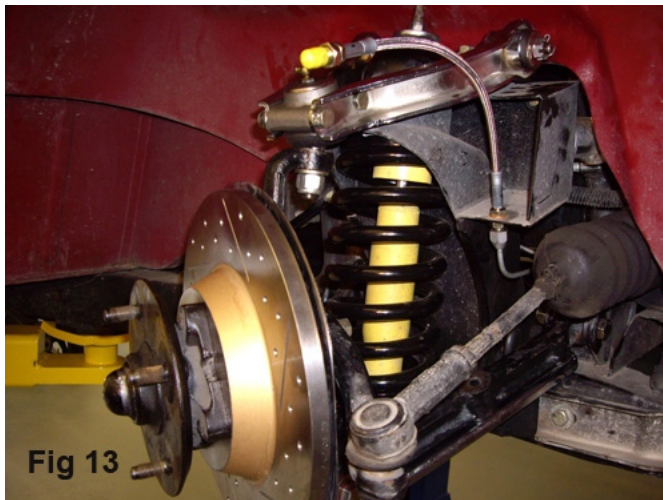
Once the springs and shocks are in place, the new hubs and CV axles (**Fig. 11**) were installed and bolted up to the diff. and the trailing arm housing. I had to check for any interference between the CV joints and the inner walls of the trailing arm housing as this is a pretty tight fit.

Once everything was put together and torqued to spec I moved on to installing an adjustable torsion bar set-up for the rear. Again I sourced this from GoodParts knowing that the quality, the fit and the instructions would all be top notch. (**Fig. 12**). The only thing I could not do myself is the exhaust system. Once the car was completely finished and the new tires were mounted I had Brad's Towing haul it to Competition Muffler who did an amazing job routing the twin pipes around all that hardware while still maintaining sufficient ground clearance

I then moved to the front suspension. Again, I replaced all the front bushings with new Nylatron units and installed the shorter competition springs.

The stock front brakes are discs so more can be done here to improve braking. I started with S.S. braided flexible lines, installed new cross drilled rotors and chose green competition pads (**Fig. 13**).

The front end also got the new torsion bar treatment to improve cornering and roll characteristics (**Fig. 14**).



Finally I wanted to stiffen up the steering rack mounts as the stock rubber bushings promoted a slightly sloppy feel at the steering wheel. Instead of replacing the stock bushings I installed solid aluminum brackets that eliminate any play or give at the mounting points.

A new set of wider modern tires gave me the look and feel I was looking for

The car now looked and handled the way it should and I looked forward to pushing its' limits in a more formal way at some of the proposed track days we talked about.

However a Jag E-Type came along and convinced me it needed a new home. Something had to go and hopefully the new owner will drive it like it was meant to be driven.