

Delco Lever Shock Rebuild Guideline

What I found and did

This is just a guideline, every situation is unique.

Please read the disclaimer at the bottom

Happy Fixing!

I bought my 49 Deluxe in September of 2012. I did some research and found out about the front shocks. It explained how to check the oil. I checked oil level and found them both to be empty. So I did a little more research, and talked to one of my co-workers who is in to off road bike racing. He brought out a chart of different oils used in shocks with their viscosities. The properties of AW-46 seemed like a good choice as I wanted summer weather dampening. I filled the shocks and left things alone for a bit while enjoying my new found toy. I was under the front of the car a short time later and discovered that the driver's side was leaking, due to the tell tale streak down the frame. So a winter undertaking was born to rebuild my front shocks.



I did one at a time. Jack up the front end and support appropriately. Remove the front wheel. I followed the instructions in the service manual to remove the shock. You will need something to support the spindle after the shock is disconnected for the top of the kingpin. I took measurements and counted threads before I disassembled the attachment point at the top of the kingpin as I did not want to have to deal with front end alignment issues when I was finished. (Do what you are comfortable with, this worked for me with no steering issues after assembly)

I pulled the driver's side first, and disassembled it to the point of knowing what was needed. I gently clamped the shock in my vice, holding it on the end caps, with a block of wood under it for it to sit on and be stable (it wanted to pivot due to the shape of the cap) and pushed the end of the arms back and forth sideways, putting a side load on the shaft. This was to check for wear in the bushings inside. Mine moved, so that meant at the bare minimum, I needed new bushings.

I tack welded a $\frac{1}{2}$ inch nut to the top cap, screwed a bolt in to the nut and gently tapped the bolt sideways with a hammer to remove the top cap.



At this point set the shock on the bench, push the end of the "A" arm down to touch the bench, take a center punch and hammer and put a mate mark in the top of each arm and the piece under the cap(dog) in a straight line, in line with the shaft. I forgot to do this with the first one. It makes assembly easier.

To remove the end caps, I clamped the shock in the vice with the cap up. I had to heat them up slightly to get them loose. I used a pipe wrench carefully. I still ended up putting some marks in the cap from the wrench jaws. (Please use your discretion; there could be a better way to do that). There is a disc under the cover with grooves. (Cap and disc are sitting on the back part of the vice). The mating surface on the shock body is also grooved and there is a gasket between these two parts that sits on the grooved part.



When I got both caps off, I found two pistons that are supposed to be bolted together. Mine were not. There are springs under the head of the bolts.



The pistons in the passenger shock were together as they should be and caps similar to a frost plugs,(small circle, left side) sealing the bolt area.



As you can see there was lots of dirt in the shock. Passenger side was not so bad. Because of the dirt in the drivers shock, the pistons were stuck, each one near its respective cap, which was the reason for the bolts being broken. To get the pistons out, I had to first remove the arms and shaft.

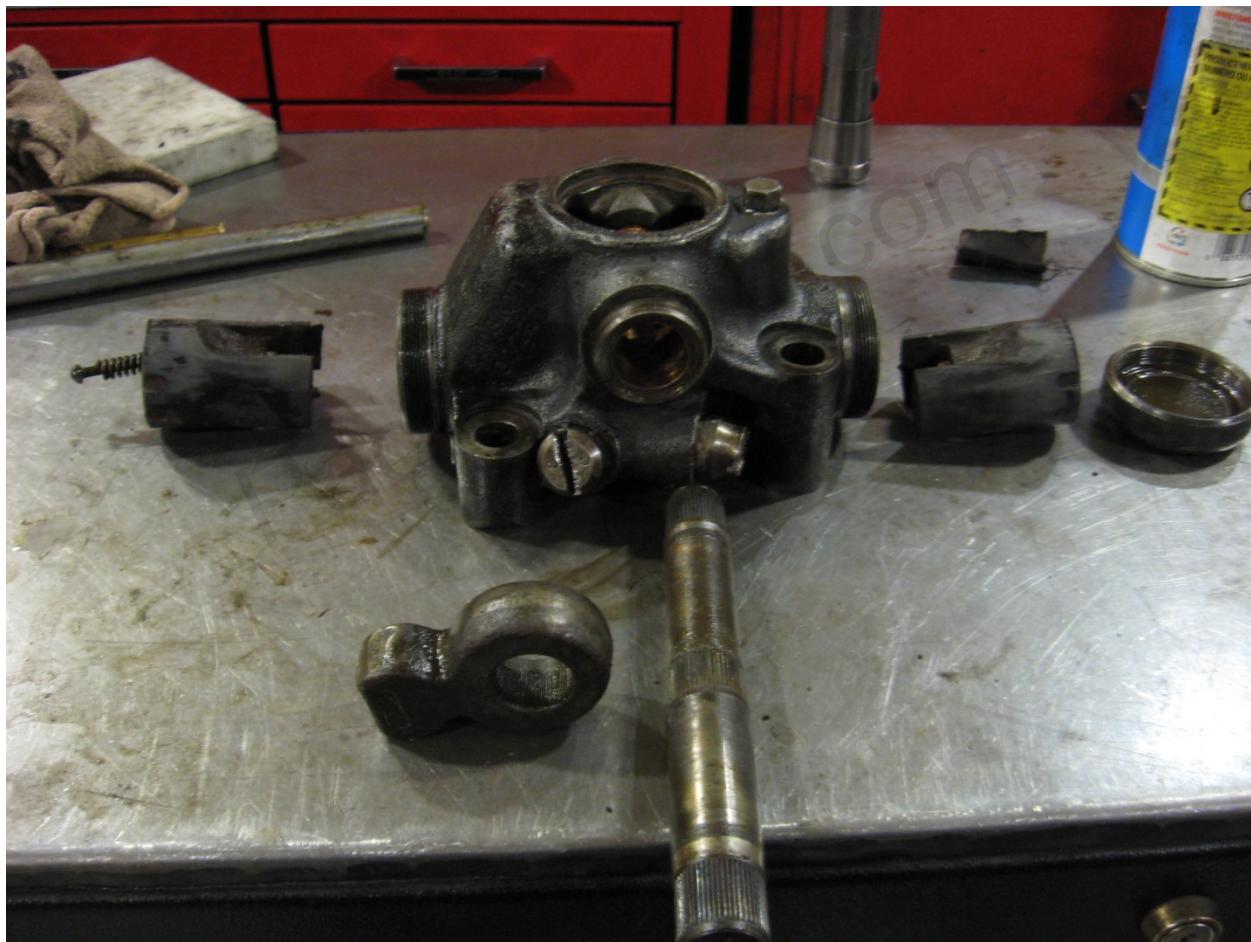
To remove the arms, I saw no other option but to cut between the two ends (your discretion, there may be another way) where it looks to be welded from the factory, near where it attaches to the wheel assembly, Take measurements between the ears before you cut to be able to weld it back together in the same position.

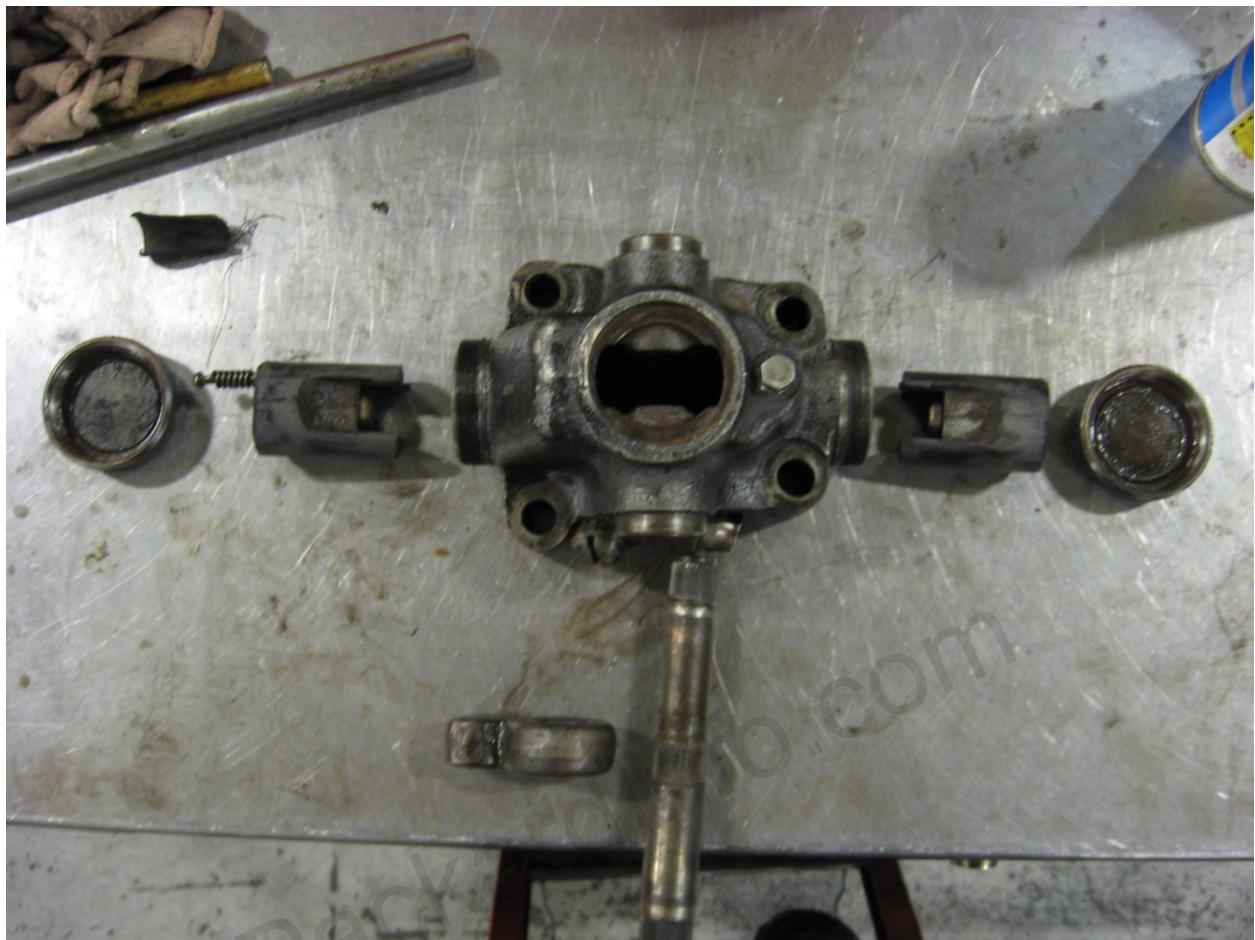


I used a 4 ½" grinder with a thin cutting disc so as to remove the minimum amount of material. I put a 3 jaw puller with a gear clamp around the jaws to hold it from slipping (two jaw would work also) on the end of the arm at the shaft. Note: Pay attention to which way the arms are to the body, even though the shaft is a step shaft. Note in the picture below that the left end is larger than the right. For what it's worth the narrow mounting bolt holes are the wheel side.



I had to use a torch to heat up the end of the arm to get it off of the shaft. I had to get mine to a dull cherry red before it would come off. Same for the other arm. I used a small chisel and a screwdriver to get the seal caps off, doing my best not to damage them in case I had to re-use them. To get the shaft out of the center piece and out of the body, I used a piece of pipe about the same size as the part of the body where the seal cap was, and long enough to allow the shaft to be pushed out. Put it in a press and pushed the shaft out using an appropriate sized piece of steel to push the shaft through the body. **** Make sure you push from the small end of the shaft**.** Once I got the shaft and the center piece out I worked on getting the pistons out. I made sure to keep each piston in its respective end. I don't know if it makes that much difference, but I figured after 60 some odd years of wear, best to keep them in the same orientation as they came out. Also note which way side is up. Here are a couple of pictures of the shock apart, minus the "A" arms.





Next step, I removed what was left of the broken bolts out of the pistons and determined the thread and length, and got new bolts. Next I check how the pistons fit in the body. They were tight, so a very light cleaning with a brake cylinder hone. Cleaned just enough that the pistons moved freely. I assembled the pistons with new bolts. Do not over tighten the bolts at assembly. The reason for the springs is some cushioning as the arm moves the pistons in the shock. I then installed the assembled pistons in to the body, again to check to ensure no binding. If your pistons are together, you can use a screwdriver to pry out the center dog.

There are check valves in the pistons. You can just see the back side of the poppet, the small spring that holds the poppet against the seat, and the larger clip that holds everything in place. The check valves allow oil from the reservoir in the center to the working side of the piston.



For the check valves, there are 2 pieces of .005 thou shim stock attached to the piston. Here you can see the shim on the piston.



I ground the button in the middle to remove the shim to measure the thickness. The shims were not in good shape.



The poppet's are not something you can buy. I needed two. I was told that due to the damage, my shock was considered a non-rebuildable core. I looked at the poppet and figured I could make them. I took a piece of 1 inch diameter hot rolled bar stock, chucked it in a lathe, and turned a portion of it down to the diameter of the poppet. I then drilled a hole in the center the appropriate size to tap the hole for a 6-32 machine screw thread. The shim side of the poppet is beveled. I machined the bevel, then put a "parting" tool in the lathe and moved tooling to machine the back side of the poppet. Machined it down to the diameter of the shoulder on the back of the poppet, then moved it again just enough to get the right height of the shoulder and machined it until the piece fell off. The shoulder is what keeps the spring centered on the back of the poppet. Below are a couple of pictures of the new poppet





I made several shims (I had access to a shim punch) in case I screwed a couple up. I had to trim the outside of the shim slightly to fit properly. Then I drilled a hole in the center so the 6-32 machine screws would go through.



I then assembled the poppet's with red Loctite[®] and put a nut on the back for good measure. I called Loctite[®] and asked how well the permanent (red) would work, submersed in oil for life. I was told that it should not be a problem, just make sure it gets a full 24 hour cure before submersing in the oil. Below are a couple of pictures of the assembled poppet.

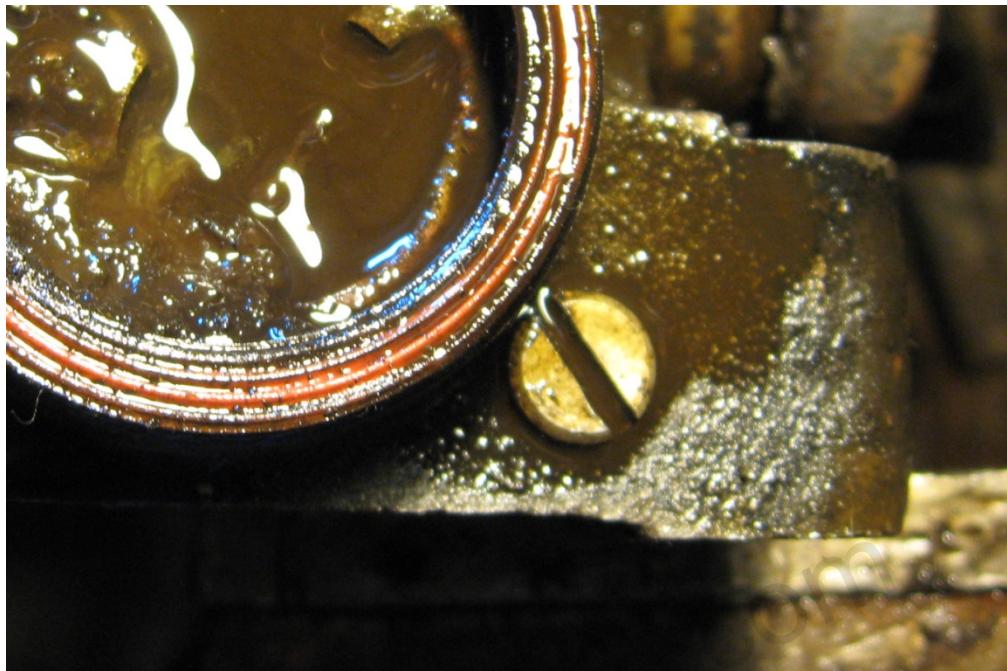




Next to remove the bushing from the housing. I used a die grinder and a small burr to create a weak spot in the bushing so I could collapse it. Take care as not to go through and mark the housing. I collapsed the bushing with a small chisel and screwdriver. Again, try not to mark the housing. Next was to get the relief valves out. These control the jounce and rebound. The caps are marked, so I stamped the body near each one with the same number as on the cap so I wouldn't mix them up. I had to heat the area for each one to get it to break loose. I also had to use (gently) an impact gun with a blade screwdriver attachment to loosen the caps. It was difficult not to damage the caps a little. I tried using a piece of flat bar, and all it would do is twist and bend. When you get them out, pay attention to the order of assembly. They are different from each other. Also make sure you clean the small poppets well as there are small oil galleries going through them. Sorry, no pictures.



There is also a drain plug that should be removed.



Now that it's all apart, you can clean the galleries that run from each piston area to the valves and drain. The bushings for the shafts were worn because of the lateral play in the arm. I contacted a repair shop, asked if I could buy parts and informed them that I needed a shaft, bushings, seals and check valves and relief valve springs. They offered me two kits, small and a large. The large kit had everything that I needed. They do not sell the check valves (because they don't have them, hence me making them) or relief valves or springs. (Mine were ok, just happen to ask). If your relief valves are damaged in any way, you will need another core, or have to take a different direction with the repair. The kit came with shaft new seals and caps, end cap gaskets, seal rings for filler plug and relief valves, springs for the checks, main cap, bushings and shafts that were ground down to the top of the splines. (In my opinion, there is a different way than to grind the shaft down that far, but it would also add cost to the repair.)

So I could insert the bushings, I machined two mandrels to fit the bushings. I measured the OD and ID and made them so that part of it would fit inside with .003 to .004 thou clearance as the bushing is made to have an interference fit in the housing and will shrink as you push it in. A shoulder that would push on the end of the bushing with the diameter small enough that it would fit inside the housing.



I had to make two because of the different sized bushings. To insert the bushing, I sprayed some light oil on the outside of the bushing, and in the housing. Put it in the press and pushed them in. Please use caution, and make sure everything is square so the bushing goes in straight and won't collapse. The bushings will have to be honed to fit the shaft. I started with the large side. I used a brake cylinder hone and drilling/ tapping fluid. Take care to make sure you hone the full length of the bushing equally to keep it concentric. I only honed until I got a nice fit and it moved easily. I honed the small side the same way. I then used bearing blue on the shaft, inserted the shaft in to the bushings, though the housing and looked for high spots. I hone any of the areas where there were high spots only until I got a good fit and no binding. Next, press the new shaft in through the centre dog, **pushing from the large end**. If your pistons were broken like mine, you can insert/ assemble them after, if they are together, you will have to insert them and put the center dog in before pushing the shaft through. Make sure to line up the splines. Positioning is not crucial at this point.

Then install the seals and seal caps over the shaft. Next is reinstalling the arms. Line up your splines and center punch marks (may not line up perfectly). I unfortunately damaged the lead of the spline in one arm. I took a die grinder with a small burr and removed the damaged part. I made that area touch bigger and the shaft so I could line things up correctly. It was not enough that I felt that the integrity of the spline had been compromised. I pressed the arms on paying attention to ensure that everything was centered and straight, and to the dimension between the ears was as it was when the weld was cut. I then welded the arms back together. Now if you remember, one of my piston sets was apart. I assembled them after I had put the shaft in. I needed to seal the bolt head area as the caps were gone. I again took my die grinder and a small burr, and in the bolt hole, in the area where the bolt head sits, I made a small groove around the inside of the hole. I assembled the pistons, mixed up some 5 minute epoxy glue and poured enough in to fill the bolt hole. The purpose of the groove was to act as a retaining ring for the glue. After the glue had set, I put the end caps on. I did not use the end cap gaskets that came with the kit, as they were full diameter of the disk, and I didn't think that they would seal well because they would not sit properly. (This is just my opinion). I cut seal rings out of heavy gasket paper and assembled. I clamped the shock in the vice on the end caps, using the block of wood again, and started to fill the shock with oil. After I got some oil in the shock, I started moving the "A" arm up and down, to move the oil through the shock. As I proceeded, I started to get resistance. Once it was full, I pulled hard on the arms, and to me seemed like good resistance in both directions. Next, I installed the cap. I did not use the cap that came in the kit, as I wasn't sure how I was going to install it. It's a domed cap. I sprayed some brake cleaner on a rag and wiped down the cap seating surface in the shock body. I did the same to the original cap. I then ran a very small bead of blue gasket maker around the cap area of the body, making sure I had enough to seal the cap, but not so much that it would extrude in to the shock, and gently pushed the cap down on the gasket maker enough to make sure I had contact all the way around, and left it to cure for at least 24 hours. Shock is finished.

Disclaimer

Please use your discretion. I am by no means an expert. Assumptions have been taken in writing this article. Remember, you are working on your upper "A" arm which is a major part of the vehicle's suspension. If you have any doubts, let the people that do this all the time, do it for you.

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