

The Great MKIII Golf/Jetta Rear Drum Brake DIY.

Ahh, drum brakes, the oldest of the old. The dirtiest of the dirt. Hated by most everyone for being over dirty, and hard to work with. With the help of this DIY you'll be able to tackle your drum brake psychosis.

A few words of warning:

Brake dust is bad news, and breathing it is not good for you at all. Sure, you heard stores that Asbestos is no longer used in brakes. Sure, right.. well, perhaps not, the dust may or may not be something bad for you, chances are its bad for you. Back in the day, all brakes were made of asbestos. Now a days we have new "safer" alternatives. I call BS. for years, people thought asbestos was safe. Chalk dust is not safe, its been proven.



This "how to" assumes you have some basic tools, and safety gear. Safety glasses should be worn at all times when working with tools and automotive fluids. Always use a hydraulic jack and safety stands when lifting or getting under a vehicle. If you are unsure on where to safety lift your vehicle, refer to its owners guide. Brake dust can contain asbestos which has been found to cause cancer. The writer of this how to assumes zero liability in how to use this guide, or any damages that may come from it to you, your property, or others and others property. If you are uncertain at any point, refer to a qualified automotive technician.

Basic Rules, clean brake fluid up with cold water. Keep all fluids, water, dirt, and oil out of the brake system (except for clean brake fluid). Keep all and any grease off pads, shoes, and drum brake surfaces. If shoes become contaminated with grease or oil, throw them out and buy new ones. If drums become oily, clean them with brake clean, or hot soapy water.

Also, if you have never worked on a car before, don't make this your 1st job. [I'd suggest that you at least get your hands dirty working on the easier to deal with disk brakes](#) (at the front of the car). Also, the rear drum design on this car has adjustable wheel bearings. **I don't cover this in this DIY. [I covered that back in the rear disk brake DIY.](#) [Follow the steps there whenever working with the bearings. The bearings, removal, install, parts, and adjustments are 100% the same on the disk or drum cars. So please, make sure you refer to that DIY for that part.](#)**

Also, when it comes to the hydraulic system, we'll OPEN the system in this DIY. And that is not a small task. It's not a huge one either. So when needed refer back to parts of the original front brake DIY as a refresher. We will

really bleed brakes big time here.

IMPORTANT!

Never take both sides apart at the same time. Use the one side as a guide as you rebuild the other. There are a lot of springs, each one has a dedicated purpose and they are under a lot of tension. Using the wrong tool (all too common!) will damage the spring, and your hand, and perhaps your eye. DO NOT press on the brakes when the drum is not in place! You will cause the wheel cylinders to explode and blow out. When dealing with drum brakes I cannot stress enough how important it is to keep your personal safety as the number one thing to keep in mind!

For both the springs and the bleeding, it might be helpful to have an extra hand. So call up a friend, buy him or her lunch, and put them to work when needed.

Drum Brakes, a brief history..

Drum brakes are the most basic, and classic brake design. They are long wearing, self adjusting (for the most part), quiet, and best of all they don't make the wheels dirty. They are inexpensive to manufacture, and easy to service... well, they are not as easy as disk brakes - which is where they get a bad rap.

But have faith, take your time, work safe, with quality proper tools and you'll make out just fine.

Drum brakes last longer than disk (in the rear of the car) because of weight transfer when braking. The car's weight transfers to the front of the car. 70-90% of the brake energy that slows the car is from the front disk brakes. The less stress on drum brakes makes them last far longer than disk brakes on the front of the car. For most people it's fine, daily drives, even a few cars use them on the track. IMHO Rear disk brakes don't stop with any more force, but they do look cooler, and stop the car a bit *faster* due to the hydraulic system.

There are several types of drum brake designs out there, this one is known as a "single leading" or "non servo" brake.

Drum brakes have to overcome spring force before they start to work, where calipers work faster. Cars today still come with them stock, because, well, they just work, don't make a peep and best of all, keep the wheels clean. That being said, the MKIII model line was the last line of VW cars sold in North America with rear drum brakes. If you want to feel nostalgic this VW style brake design is pretty "classic" in design, it's been in use since the Dasher/Rabbit. If you're reading this and are a MKII or MKI owner this DIY works 99% of the same for the older cars as well. Don't believe me? [Go watch This!](#)

Also, a good idea oh **how** the brakes work can be found [here](#).

How do I know they are bad?

A few ways to tell they are in need of repair are signs of fluid leaks, a hard pedal (so hard when pressed it does not stop a spinning rear wheel), a "low" brake pedal, squeaks or grinding sounds from the rear. A "low" pedal means that the brakes work, but the pedal does not seem to do much to stop the car until its almost at the floor.

To Test The Brake Adjustment: Start the car have it in neutral. Press the brakes several times hard. Pull up on the parking brake. Press the brakes again. Does the pedal feel firmer now? Higher vs. lower? If so the brakes are worn, or very out of adjustment. If doing this several times results in an overall better feeling pedal - chances are the brakes were out of adjustment, no need to take things apart, go drive the car and enjoy it. You'll find that people who have automatic cars tend to have rear brake problems due to their lack of parking brake usage... always use the parking brake.. keeps things adjusted and flowing freely.

How long does this take?

If you never messed with drum brakes before, expect 4 hours.

Tools Needed:

- Bentley Manual!
- Large pair of "Channel Lock" or "Water Pump" pliers
- 5mm Allen Key Socket
- 11mm flair nut wrench
- 8mm box end wrench
- 15/16" socket
- 3/8" handle ratchet
- Needle nose pliers
- Standard Pliers
- Brake Spring Hold Down Tool

Rubber Hammer
Small pry bar
Seal driver, or Bushing driver set - A must have for this job (for installing bearing races into the new drums)
Bearing Packer (Optional)
Needle Nose locking pliers (vice grips)
Jack stands, floor jack, 17mm 1/2 drive socket and breaker bar.
2x4 Block of wood about 6" long.

**Consumables:**

LOTS of clean rags!
Wheel Bearing Grease for Disk Brakes
2-3 Cans of Brake Clean (Spray Can)
Caliper Slide lube (yes! even for drum brakes!)
DOT 4 brake fluid (2 Qts or 2L)
Engine Paint (Optional)

Step 1 - Get the parts you need and make sure they are all correct!



- High-Temp Engine Paint (optional)
- 2 - Wheel Cylinders
- 2 - Dust caps
- 2 - Inner Wheel Bearings w/ races
- 2 - Outer Wheel Bearings w/ races
- 2 - Cotter Pins
- 2 - Inner Grease Seals
- 1 - Set of rear brake shoes
- 1 - Spring kit (for both back brakes, not just one side!)

I washed the drums in hot soapy water and dried them off. Wiped them down with lacquer thinner and then sprayed them with a high-temp engine enamel. No need for fancy colors please, just clean gloss black will do here. Caliper paint is overkill. Drum brakes don't get anywhere near as hot as disk brakes do. Just paint the outer part of the drum that you'll see when the wheel is on. Do not get paint on the braking surface.

Why would I change more than just the shoes? - Its a very good idea to change all of these parts at the same time. Reason being,

1 - Wheel cylinders don't age well. Used to be people rebuilt them, but for \$13 a side, why bother. Change them, often on a brake job if they are not changed, the new shoes will push the internal pistons past grooves from sediment and they will cause a leak all over your new hard work.

2 - Springs get work hardened and weak. If they fail a brake may not adjust properly or retract when you take your foot off the brake.

3 - Drums and bearings. Getting the bearings out of the drum is a pain, and while the bearings are not expensive, the drums are not too much either. New shoes should go up against fresh metal, if not chatter, noise, poor pedal feel, and lack of parking brake action. Unless you are getting drums machined I would replace them at this time. Special measuring tools (no, not a ruler) are needed to measure a drums wear and surface. **This DIY does not cover this operation.**

Do not re-use fasteners that are worn or deformed in normal use.

Some fasteners are designed to be used only once, and are unreliable and may fail if

used a second time. This includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins.

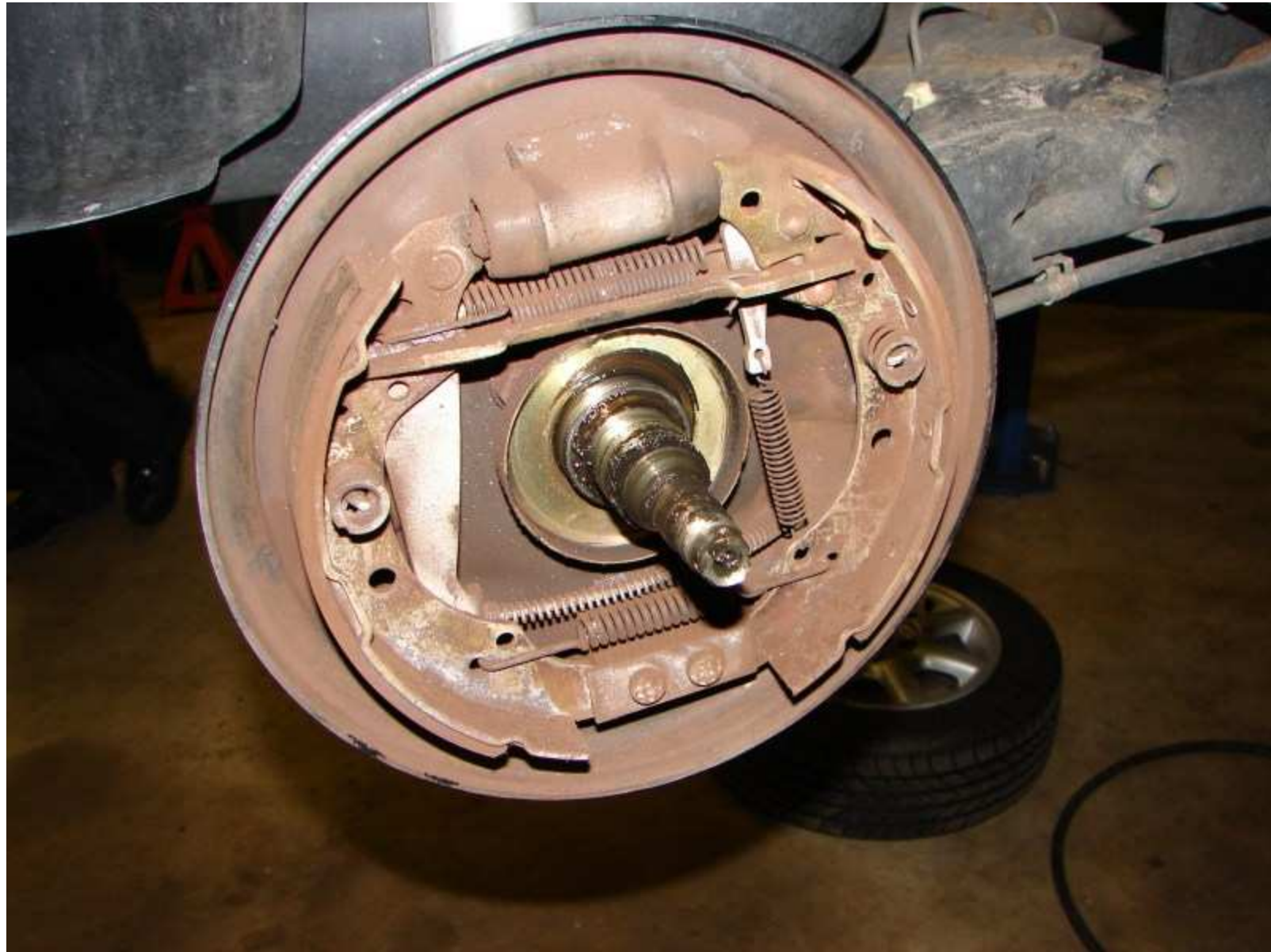
Step 2 - As outlined in the [parking brake DIY](#) open the center console and loosen up both parking brake adjusters as shown. **Make sure the parking brake is OFF.**



Step 3 - As outlined in steps 2 - 13 in the [rear disk brake DIY remove the drum.](#)

Once its off, it should look something like this.. Good signs, no leaks from the wheel cylinder, even shoe wear, no busted springs, clean spindle, no grease blown out from the rear grease seal. Pull both sides. This way you can reference one side as you put it back together. These are pictures of a 70,000 Mile 9 year old brake drum. This is OE hardware. From the looks of things, its not too bad at all. The brake shoes would pass inspection, but the adjuster wedge is hung up. I also did not like the low pedal I had and the lack of rear brakes.. So I will change everything anyway.







If the rear drum cannot come off the spindle as you pull it towards yourself (once the cotter pin, cage, spindle nut and outer bearing are off) chances are the shoes are worn and have left a ridge on the backside of the drum. You'll need to retract the adjuster. Do this by spinning the drum so you can insert a flathead screwdriver into one of the lug holes. From there flick up the retractor and the shoes should retract and then you should be able to take off the drum.

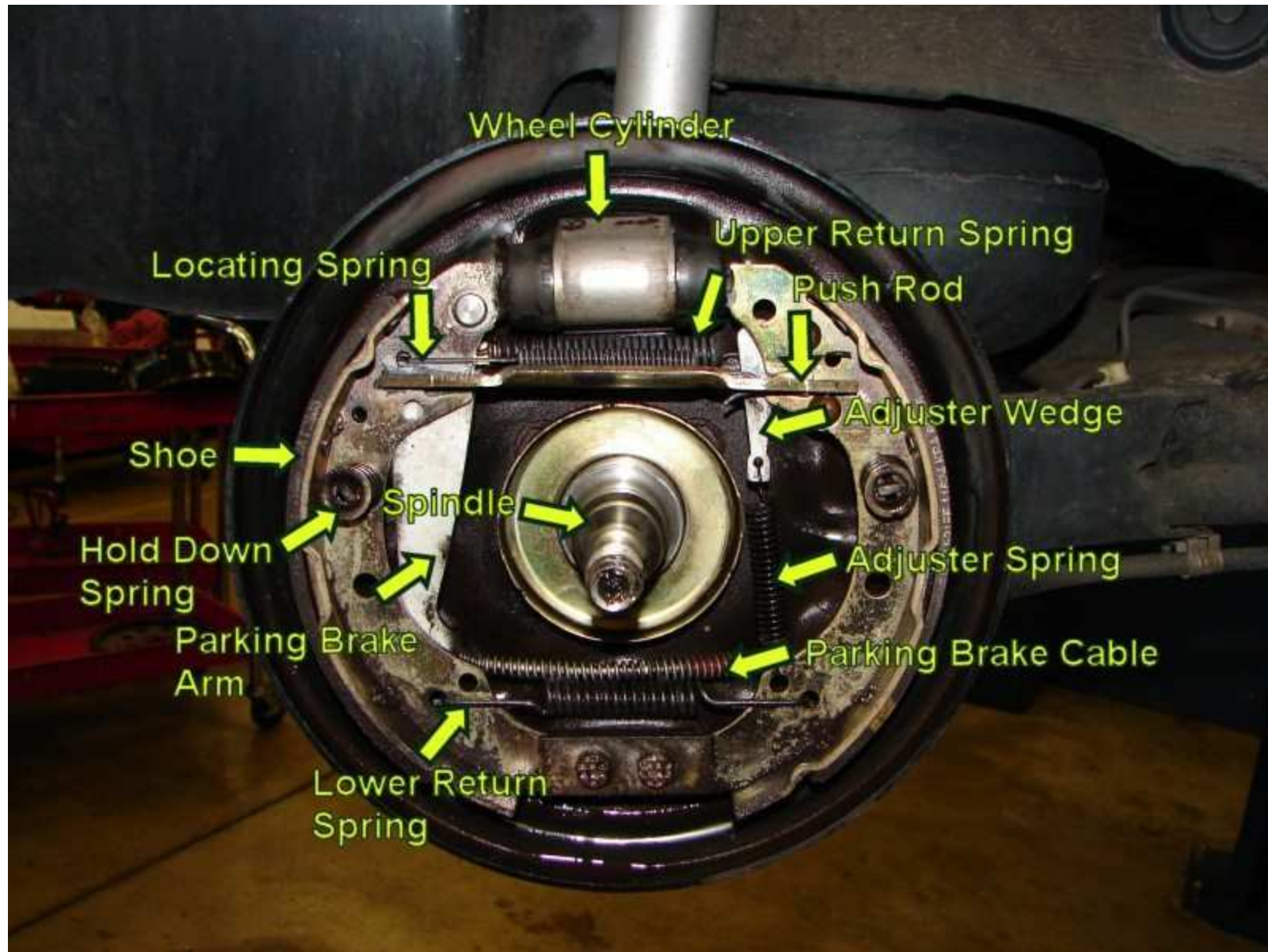
You'll need good light to peer into the drum and see the adjuster.

Step 4 - Visit the Master Cylinder, and make sure its full of clean fluid.



Step 5 - Carefully wash down the rear drum brake with a spray based cleaner. Collect the "drippings" in a metal pan. Dispose of it with used motor oil.

Get to know the names of the parts and where they go. What they do:



Lets talk about the main players here.

Wheel Cylinder - Hydraulic part of the rear drum brakes. When pressure is applied from the master cylinder two internal pistons come out and push against the shoes. The shoes in turn "float" on the backing plate and press against the inside of the drum. This part should be replaced at every major rear brake job, and is often the source of leaks.

What to watch for:

If you press the brakes with the drum off, the wheel cylinder will expand to the point it "bursts" and it will leak. Never ever press on a drum brake while the drum is off. Its surface is needed to hold the wheel cylinder together.

Fluid leaks (a drip) is reason to replace it. Pull back the rubber boot and inspect it. Anything more then moisture (fluid) is bad.

Stuck or seized units - Improper change intervals of brake fluid are certain deal for these guys. Rust from moisture builds up in them and then they cause a rock-hard pedal but poor braking.

Why it should be replaced:

Nothing lasts forever; new shoes often damage the internal cup seals inside the wheel cylinder. If new shoes are installed on an aged wheel cylinder I can guarantee it's going to leak when the new shoes are installed.

Just replace it, you'll be glad you did. If your keeping track, that's the third time I told you to replace them in this DIY.

Upper and Lower Return Springs - These very strong return springs pull the shoes back to their original positions after the wheel cylinder pushes them out toward the drum.

Be careful when taking these on and off the brake setup. They have the power to break fingers, cut skin, and puncture eyes. Yea, I'm not kidding at all. Again, order a spring kit. These get work hardened over time and should be replaced as part of drum service.

Shoes (not pads!) - Shoes are the friction material that contacts the drum. Any grease on these is reason to trash them. Bonded units should be replaced at 2/23", riveted units can go until 1/32". The VW shoes come with the parking brake arm riveted to them. This is sweet since most cars have you take off the part, and it's a hassle.

Drum (not shown) - Friction unit. Wheel bolts and bearing unit are part of this. It should be replaced if it shows any major scoring. A thick ridge on the back side where the shoes ride to the inside of the car is reason alone to tell you they are worn. Again special tools (far more complex than a ruler) are needed to check and cut (or machine) drums. Again, new ones are in order here.

Parking Brake Cable - This guy is nothing more than a heavy duty bicycle brake cable attached to the parking brake handle inside the car. When the handle is pulled it pulls the **Parking Brake Arm** and this in turn pushes the rear shoe against the drum. The Pushrod transfers motion from one shoe to the other. The **Locating Spring** keeps the **Pushrod** pressed against the rear shoe at all times once the brake is released. So its all ready for the next time you pull the brake.

Hold Down Spring - Without these the shoes would want to "pop" off the backing plate. These keep the shoes, and springs pressed against the backing plate at all times.

Spindle - Where the bearing races, grease seal, hub nut and washer sit. Inspect it for damage,

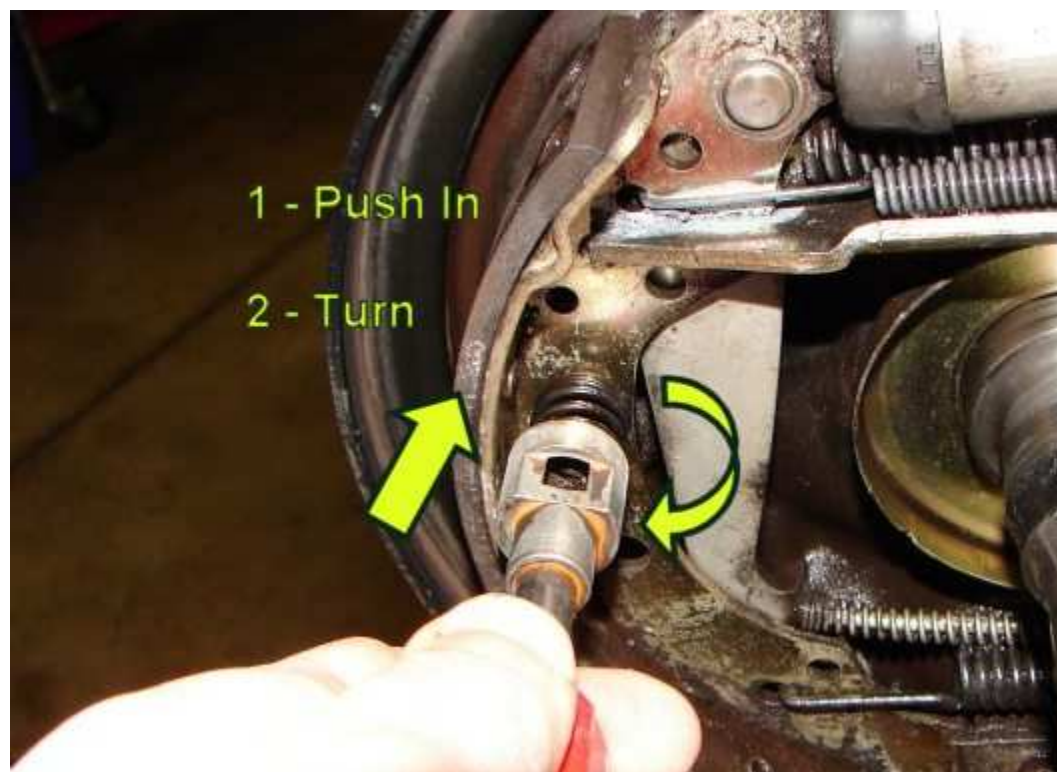
Adjuster Wedge - This little nifty deal is a wedge that along with spring pressure constantly adjusts the shoes for wear. As the shoes wear down, the wedge is pulled down by the **Adjuster Spring**. This in turn forces the shoes outward at a very slow rate and adjusts them over time as they wear out. If installed wrong, the shoes will never self adjust. Take care when reinstalling this part!

Good thing your not one of my students and have to memorize all that!!

Step 6 - Get ready for surgery, Lay out all the new parts you have for one side.



Step 7 - Start taking things apart.. in a big way.



Push and turn the hold down spring. Hold the "nail" on the back side of the hold down spring to keep it from spinning. Don't worry its supposed to turn 360 degrees and the "nail" will come out of the back of the backing plate. Do this for both the hold down springs on one brake.



Here we see the hold down springs and the "nails" still in place.

Step 8 - With a pair of pliers press move the brake shoe off its anchor. Keep ALL the springs in place.



Step 9 - Carefully shift off the brake drum shoes and springs and have them lie flat. This will require you to shim the wheel cylinder pistons some. Don't worry they are supposed to move. Just don't push them too far. Again leave the springs ALL on the shoes. They help create a "frame" that will aid you in taking things apart.



And the parking brake cable is the part left holding it to the car.

Step 10 - Using a pair of extra hands, or a set of locking needle nose pliers, remove the brake cable from the brake shoe assembly and remove it from the vehicle. Be careful, that spring looking thing is strong. Try not to damage it or the nylon coating on the cable. You'll see that it can be fished out without much issue.



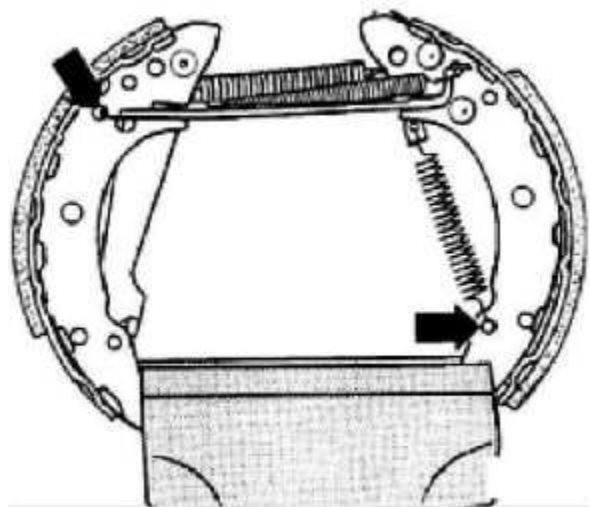
Note: We have yet to play with the wheel cylinder at this point. IF fluid starts to come out of the wheel cylinder its ok. Again, make sure the cap is on the master cylinder, if not a LOT more fluid will come out. If the master cylinder "goes dry" you have a bigger issue on your hands. So every once and a while keep an eye out for low fluid or leaks.

Lay out the parts of the old brake (still together) and the parts of the new brake.

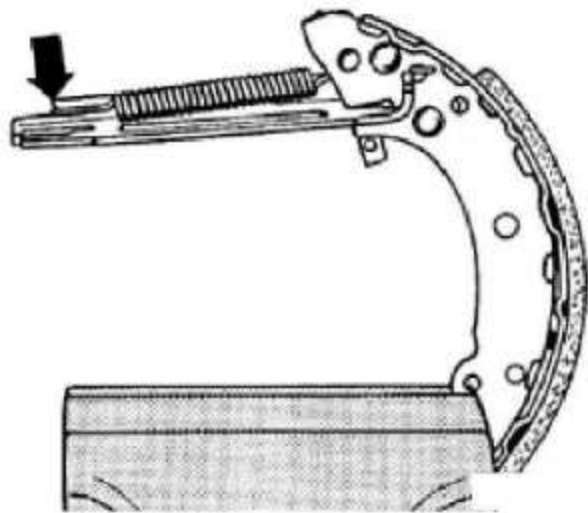


Make sure you have ALL the right springs on hand for the next few steps.

Step 11 - Myhammy Vice. Haha,, ehhh.. anyhow. You'll need a vice (a good sized one) bolted to a work bench for the next few steps in taking things apart. If you choose to ignore that, I can tell you right now that you'll wind up getting real pissed off at the springs and damage them by bending them as you try to grab and pull them. The vice works great. This is how the Bentley Manual shows its done, and its a good thing too.



Once you get your shoe-frame mounted in the vice, Install it so the shoe with the parking brake lever is free, and the other shoe is held in the vice. (the shoe on the left is free, the shoe on the right is held). **Remove the adjusting wedge spring (right arrow) and upper return spring (left arrow).**



Unhook the locating spring (arrow) from pushrod and remove brake shoe.

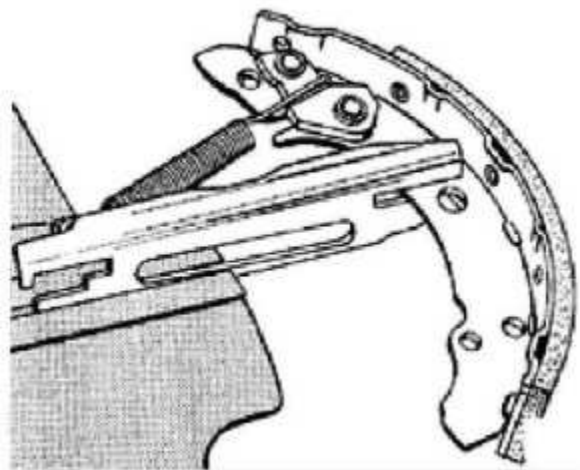


If you look, you can see my copy of the Bentley in the background on the bench. Pay **VERY** close attention to where the springs go in which hole, what direction they go in and so on. Its important.

At this point, with the location spring removed. Remove the shoe from the vice, and now carefully clamp the pushrod sideways in the vice. This will allow you to pull (safely!) and rotate the brake shoe and stretch on your new shoe and locating spring. This is the bigger of the two springs. This way it can be installed.



This is a close-up of the brake shoe and pushrod with the springs off of it. This is a handy picture since you CAN install things wrong at this point.



Connect locating spring and insert brake shoe into slot in push rod and then insert the adjusting wedge. Reverse the steps above to put the other shoe back on.

When its all done it should look like this:

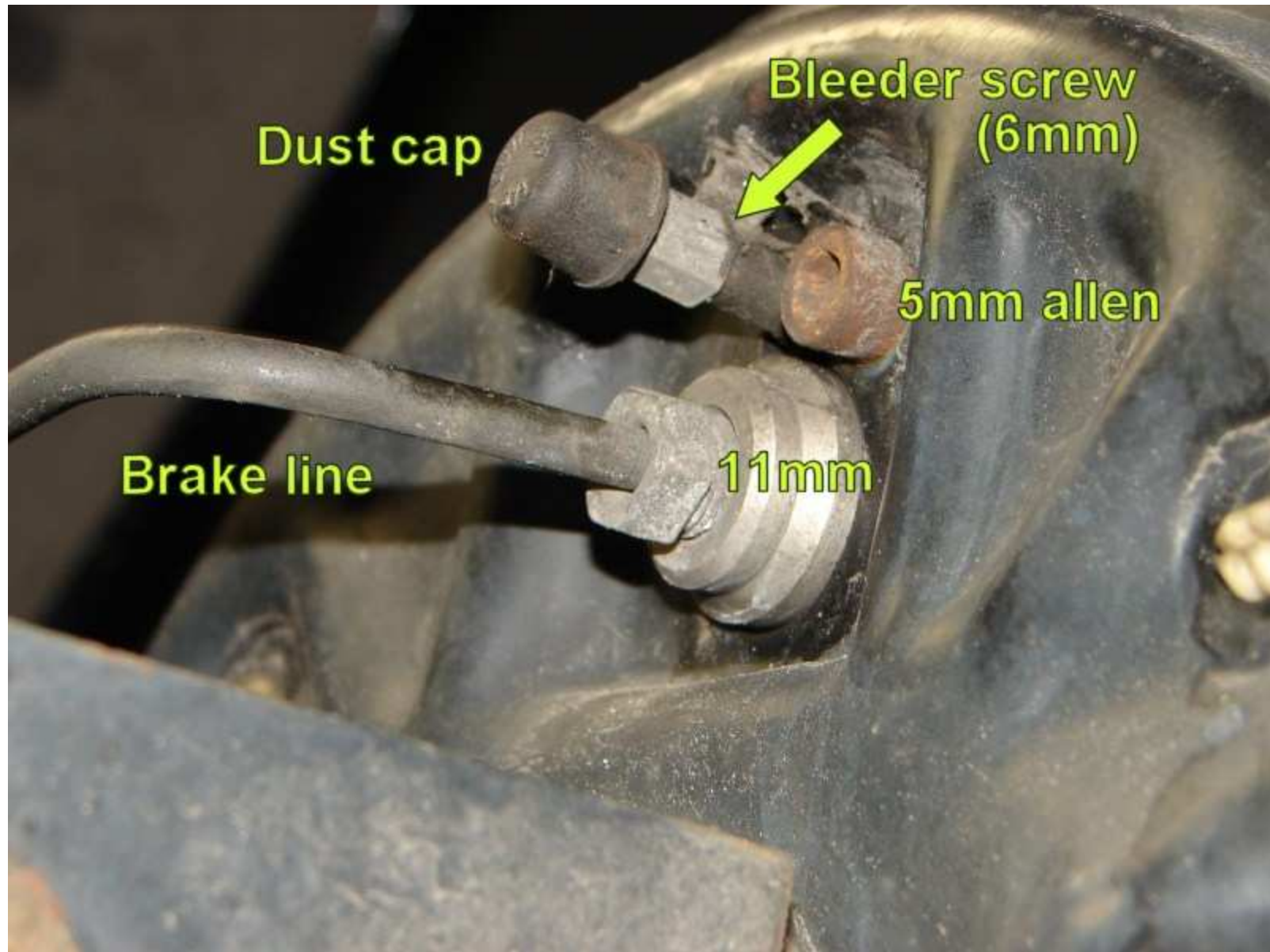


Note: The adjuster wedge is backwards!

Here is my first try at putting the shoes back together. I installed the adjuster wedge backwards. If I left it like this, The brakes would work, but never self adjust.

Step 12 - The Wheel Cylinder

HEY! Is the mater cylinder full? Is the cap still on? If you answer "yes" to both questions, good. If not go fix that now.



This is a nice close up shot of the passenger side rear of the backing plate. If you break, strip or damage the 5mm Allen bolt, you can replace it with another one. Beware the "head" might be too big with aftermarket hardware...



Use a pick and clean out the allen head, and lightly tap in the 5mm allen key to make sure its fully seated. Make sure you turn the brake line the correct way.

Work quickly, now is not the time to take a break for lunch. Once you crack that brake line loose - brake fluid is leaking out of the line. Again, watch out that the master cylinder does not "run dry". If it does you have a much larger problem on hand.

Step 13 - Remove and install your old wheel cylinder, and install the new one.



Install the new wheel cylinder. Snug down the brake line. Make sure its not cross threaded. Tighten down the 5mm allen to 89 in/lbs. When you install the wheel cylinder make sure you have the "ears" pointed in the right direction. These rotate easy.

If the wheel cylinder "falls apart", don't panic. Just carefully put it back together. The spring inside does not hook to anything, it just "floats" in between the two cylinders. Make sure that the cup seals are not nicked or cut, and the dust boots are firmly in place.

Don't worry about bleeding the brakes at all right now. We will do that once the shoes are in place and the drum is back on.

Step 14 - Grease and Lube



Lube the backing plate "buttons" with a small dab of caliper lube. Dab grease at the anchors and ears of the wheel cylinders. This step is important in order to prevent noise and binding.

Step 15 - Put it all back together.

Carefully take the brake frame and install it back onto the backing plate. Start by installing the parking brake cable 1st. Now is a good time for your friend to give you a hand again.



Hey, did you see that? Yup, this is where I really saw the mistake of my ways.



Here the adjuster wedge is correct!

Much better, this is gonna work well....

Step 16 - Bleeding

Ok, once the shoes are in place. Go back and open up the master cylinder cap. On the back side of the wheel cylinder, open the bleeder screw. Brake fluid should start to dribble out in a a short time, this may take up to one minute.



Allow the fluid to dribble out for a few seconds, again, for about a total time of two minutes. Keep an eye on the fluid level and refill it if it starts to drop below or to the low mark. Fill it slowly.

Close the bleeder screw snug it down. Do not tighten it too much or it WILL strip and snap off!

Step 17 - Finish the other side.

At this point, do the same steps as above for the opposite side of the brake system.

Install the drums. [Again, follow the procedure as found in the rear disk brake DIY for how to lubricate, tighten and adjust the wheel bearings.](#)

Fill the master cylinder.

Step 18 - Final bleed.

With the drum in place, and the master cylinder full - its now time to do one final bleed and adjust the rear brakes and reset the parking brake.

To bleed the brakes, you'll need your friend again. Place a block of wood (like a 2x4) at the base of the floor, so its under the brake pedal. This is an important step.

Why a block of wood?

What can happen (and often does) is that a ridge of rust, debris and crap builds up at the "end" of the piston stroke inside the master cylinder. This is fine, until you press the pistons down past this "end" of the stroke. Normally the brake pedal does not go to the floor as you drive, but when you bleed the brakes, the pedal goes down to the floor, well past that "end" of the "normal" stroke. In the process the piston seals and cups in the master cylinder become

danged. A week from now, the master cylinder fails.. The block of wood prevents your friend from stomping on the brake pedal and pushing it to the floor, and blowing out your master cylinder.

Ok, friend in place? Wood in place? Master cylinder full? Lets play a game, its called the "up and down game".

1 - Tell your friend to slowly press down on the brake pedal. The idea here is not to stomp on it. A slow press is key. Tell them to keep pressing once it gets firm. Tell them if they let up on the brake pedal before you tell them to, they loose the game. The loser buys lunch. Have them shout "down" while the press and hold.

2 - As they are pressing you open the bleed screw. Brake fluid will come out. Once the flow of fluid stops. Close the bleeder screw.

3 - Tell them to take their foot off the brake pedal.

4 - Go back to step 1 - do this 10x per rear wheel.

Don't forget the little rubber cap on the bleed screw, this keeps crud out of the wheel cylinder bleed screw!

While in my opinion its fine to just bleed the rear wheels, if you feel the need to do so, the proper sequence is as follows:

Right Rear, Left Rear, Right Front, Left Front.

Step 19 - Brake Adjustment.

Reinstall the rear wheels. **Torque the lug nuts to 81 Ft/Lbs.**

When your all done go see how the pedal feels. It should feel firm. Pull up **HARD** on the parking brake 4-5 times. With the parking brake "on" press hard on the brake pedal. Now let off both the parking brake and the foot brake. Next press the foot brake, and **THEN** pull the parking brake. This will center and adjust the brakes. Do this 3-4 times in a row.

Pull the parking brake up 4-5 notches, and adjust the cable (at the center console) so the wheel can no longer be turned by hand.

Release the parking brake, and make sure the wheels rotate freely.

Lower the car, go for a drive.

Enjoy your properly installed and well adjusted drum brakes.

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