

Toyota Truck Park Brake Bellcrank Repair

Toyota trucks including Tacoma, T100 and Tundra with rear drum brakes use a bellcrank apparatus through the brake backing plate as part of the parking brake system. These bellcranks, made of aluminum and steel are known for seizing up. The photo below (*fig.1*) shows the tell tale sign of a seized bellcrank, this one being on the right side. The sagging cable that runs across the differential is a warning. If you notice this you need to check the action of the bellcranks before using the parking brake further. Using the parking brake with this condition can cause damage to the brake shoes and drum.



Fig. 1 Sagging park brake cable



Fig. 2 Bellcrank stop off backing plate

A closer look at bellcrank stop (fig. 2) shows the bellcrank is not returning to its rest position. This and the sagging cable indicate a problem. Note, if you find the bellcrank not returning to stop as in figure 2 and see no sign of the cable sagging, this could indicate that the parking brake is either part way engaged or it is miss-adjusted. (See Park Brake and Rear Brake Shoe Adjustment starting on page 8) You can check the action of the bellcrank manually to verify the bellcrank is seized. It should move freely. Even if the cable is just too tight you should be able to pull the cable towards the side that is not against the backing plate, while pulling the other side off. If you find you can get no movement from the bellcrank, its time to pull the drums and get to work.

Note: Most times with a little work your bellcranks can be saved, but in some cases you may find it is simply to far gone to save. You may want to price out new ones and make sure you Toyota dealer has then in stock before you begin, incase you run into a problem. The repair shown here is on Tundra, other Toyota models may be slightly different.

Removing Toyota Drums

If you have never removed your drums, you will likely find that they are stuck in place. Rust tends to build up between the drum and hub flange making them difficult to remove.

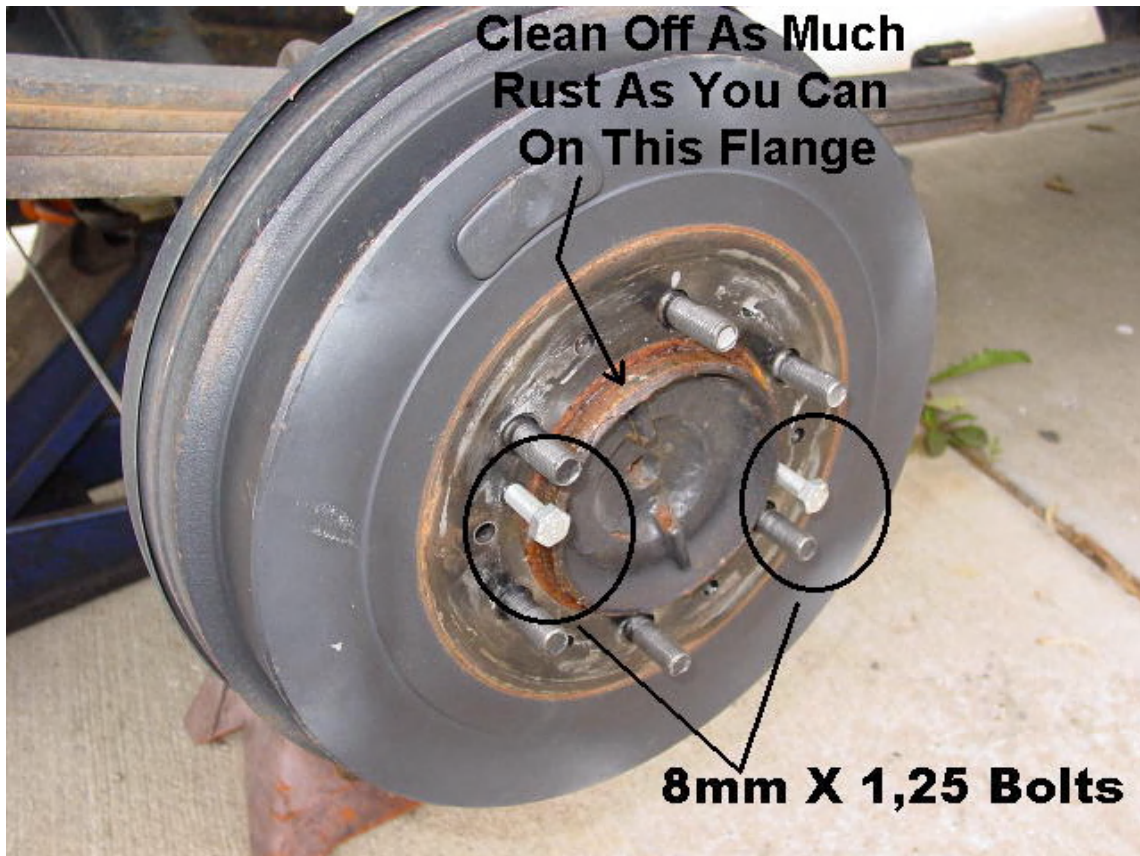


Fig. 3 Removing the drum

Here are some tips for removing the drum as shown in figure 3.

1. Using sandpaper, remove as much rust as possible on the flange that is exposed on the out side of the drum.
2. Soak the drum at the hub with penetrating oil. Be sure to spray some in the holes between the studs.
3. Using two 8mm X 1.25 thread bolts in the two threaded holes in the drum, slowly tighten each bolt until the drum pops loose.
4. If you notice the bolts raising the drum but not breaking it loose, tap around the face of the drum at the edge with a hammer. Alternate tighten the bolts and tapping the drum until the drum pops loose.
5. When reinstalling the drum, clean off all rust, and any paper gasket material. Coat the hub surface and back of drum with silicone grease. (See page 5 about silicon grease)

Removing the Bellcrank

Once the drum has been removed inspect the brake shoes for wear and cracking of the shoe material from excessive heat. If this is found, the shoes should be replaced. If heat damage is found on the shoes, inspect the brake drum surface for scoring or hot spots. If this is found the drum may need replaced also.

If no damage is found start by cleaning the brake shoes and backing plate, aerosol Brake Cleaner can be used for this. If this is not available, the brakes can be cleaned with a simple water hose if you have time to allow it to dry completely.

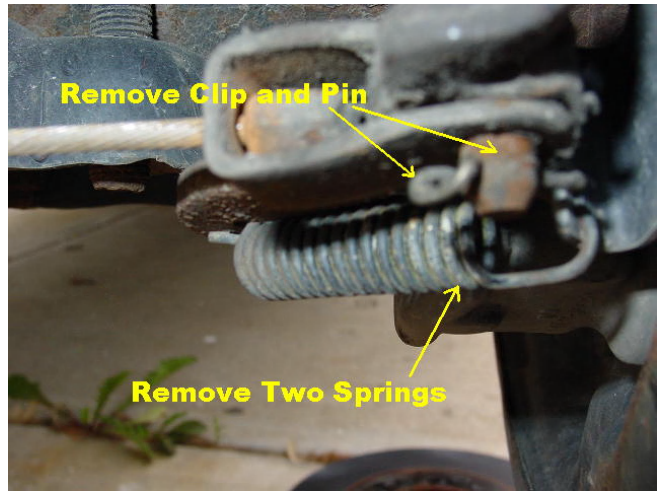
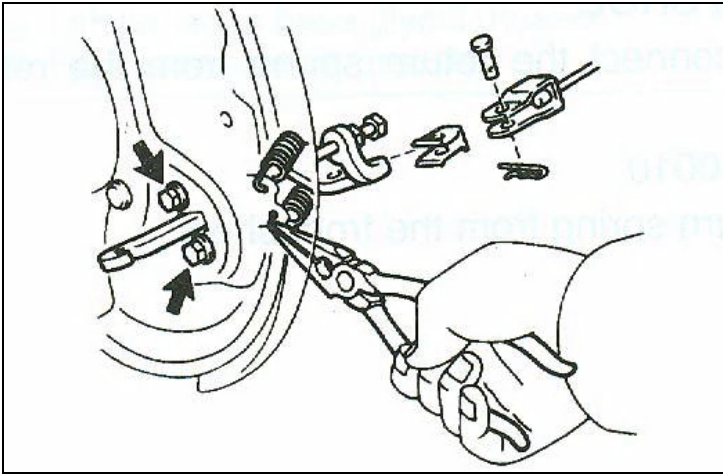


Fig. 4 Removing the cable and return springs

Begin removing the bellcrank by first removing the cable at the backside of the backing plate. Remove the hairpin and then the pin holding the cable. (*fig.4*) This pin may be rusted in place and you may need to soak it with penetrating oil and then tap it out with a hammer and punch. Next remove the two return springs as shown in figure 4.

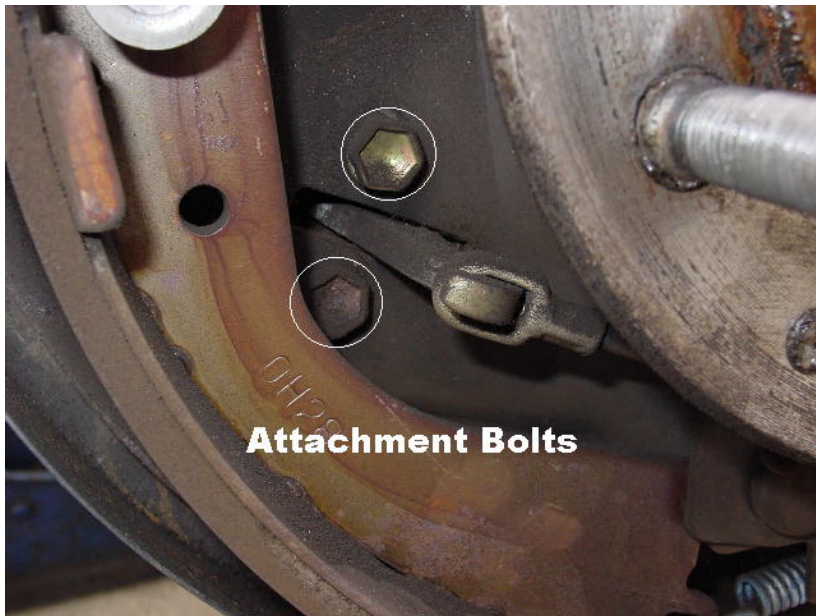


Fig. 5 Removing the attachment bolts

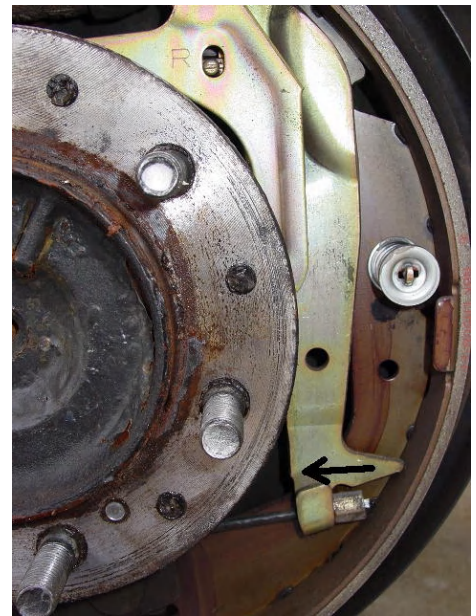


Fig. 6 Releasing the Transfer Cable

Remove the two-attachment bolts that hold the bellcrank assembly. (*fig.5*) If these bolt drag coming out, soak them with penetrating oil and work them back and forth to prevent breaking the bolts.

Using a screwdriver, push the brake arm towards the bellcrank to help release the transfer cable. (*fig.6*) The bellcrank assembly can now be removed from the back.

Disassembling The Bellcrank

You will now have the parts shown in figure 7 to clean and rebuild.

Begin by removing the rubber protective boot. Inspect the boot for damage, if none if found it can be cleaned up and reused. (fig.8)



Fig. 7 Part to be serviced



Fig. 8 Remove the boot

Remove the U clip from the pivot pin. Use two screwdrivers to spread the clip. (Fig.9) If this clips is damaged replacements can be found at most auto parts stores.



Fig. 9 Remove the U clip

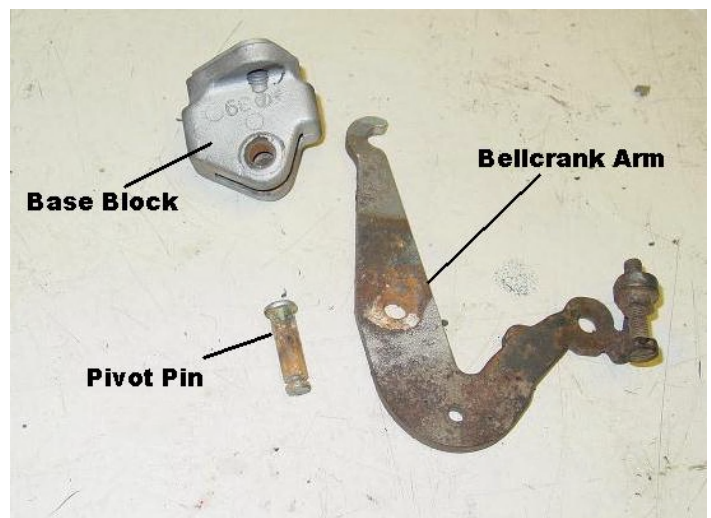


Fig. 10 Part of Bellcrank assembly

Removal of the pin may be difficult, use a hammer and punch to try and knock the pin through. If this is not working you may need to soak the assembly in penetrating oil over night. Figure 10 shows all the parts of the bellcrank disassembled. This assembly was sandblasted to aid in disassembly. Rust is still visible on the pin and bellcrank arm.

At the end of the bellcrank arm you will find an adjuster screw, this is factory set and does not need to be removed. If it must be removed or you suspect it has been tamped with adjusting procedures start on page 8.

Clean Up and Assembly

If you have access to a sandblast cabinet, this is by far the best way to clean up these parts. All parts shown here have been clean by blasting and then painted to prevent re-rusting.

If a sandblaster is not available, there are means of chemical cleaning that I won't get into here. I will only caution that some chemicals like muriatic acid will destroy aluminum parts. At best a wire wheel and some work with sand paper can do a sufficient job of cleaning these parts, the key being removing as much rust as possible from the areas that must pivot and move.



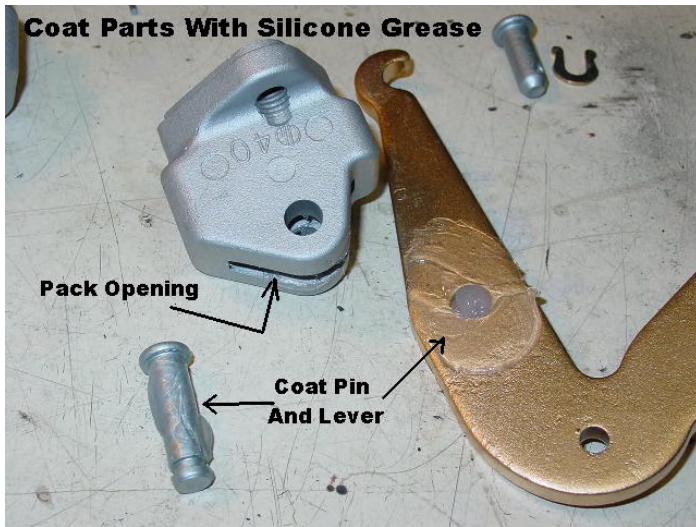
Fig. 11 All parts cleaned and painted

Figure 11 shows all the parts cleaned and repainted. Paints used here were Eastwood Aluma Blast #10109Z on the base, Eastwood Silver Cad #10022Z on the pins and springs, Rustoleum gold on the bellcrank arm. The rubber boots were cleaned using WD40.

A word about silicone grease

The key to reassembly and preventing a recurrence is to use a liberal amount of silicone brake grease. I am not impressed with some of the silicone brake greases sold at parts stores. A product made by Dynatex (part # 49593) is one of the best I have found. This can be found on the Internet or through Ryder Fleet Products for about \$8.00 a tube. This is a large 5.3 oz tube that will last most DIY'ers a very long time. It is a thick clear grease that holds up well to heat and will not wash away. It can be used as a brake lubricant as it contains no petroleum or by-products and will not attack rubber. It locks out moisture and can be used in electrical connections. I highly recommend the use of this grease.

Liberally coat the pivot area of the bellcrank lever, and the pivot pin with silicone grease. Also Pack the inside of the base block with silicone grease. (fig.12)

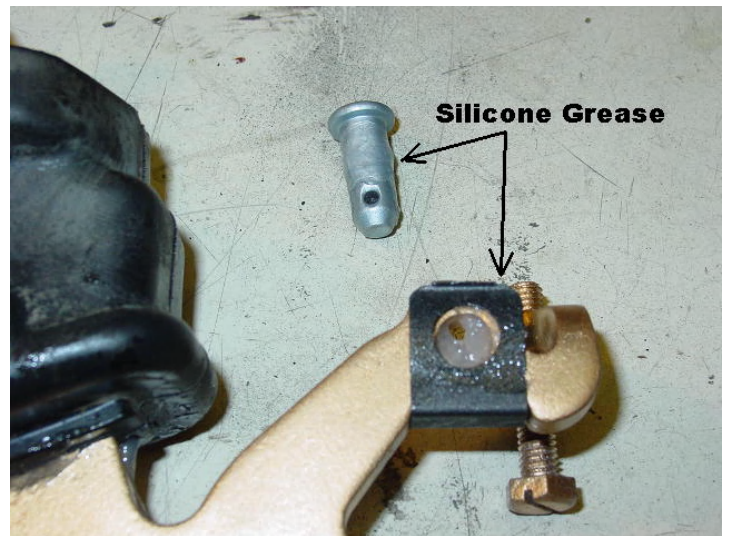
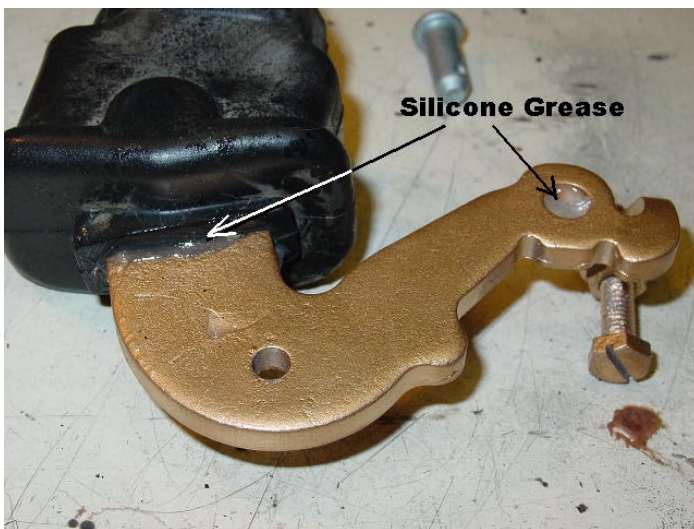


Fig, 12 Coating the parts with silicone grease



Fig. 13 Installing the lever and pin

Assemble the lever into the base, note the position of the base compared to the lever as shown in figure 12 and 13. Install the pivot pin and crimp the U clip using pliers. Pack more silicone grease around the opening in the base to prevent moisture entering. Slip the boot back into place.



Fig, 14 Grease points

Be sure the boot opening is sealed with grease and all the points shown in figure 14 are well greased.

Your brake bellcrank assemblies should look like the examples in figure 15 (next page). These are now ready to be reinstalled.



Fig. 15 Reconditioned bellcrank assemblies

Reinstall the Bellcrank Assembly

Reinstall the bellcrank assembly just as they were removed; be aware there is a left and right assembly (Left drivers side – Right passenger side) the levers should have a marking.



Fig. 16 Transfer cable must be attached

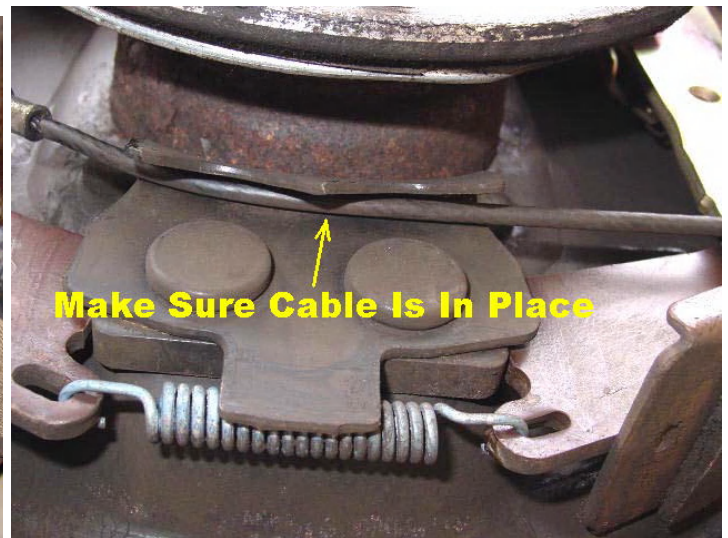


Fig. 17 Make sure cable is in guide

At the brake side, make sure the transfer cable is properly attached to the bellcrank lever and the cable is tucked under the cable guide as shown in figure 16 and 17.

It is very easy to get the cable out of place so be sure to double check this.

On the backside install the two springs, then the cable, spring clip and pin with hairpin. (fig. 18) At this time if the stop screws on the levers come completely back against the backing plates No adjusting is need to the park brake, but if it is not, or the stop screws were removed, you will need to readjust the park brake cable from scratch.



Fig. 18 Backside bellcrank installed

Park Brake and Rear Brake Shoe Adjustment

If the stop screws were removed or changed, you will need to detach the park brake cable and remove the two return springs on the back of the backing plate.

- Referring to figure 19, pull in the direction of A until there is no slack in the transfer cable at B.
- Be sure not to pull the self-adjusting lever off of the shoe stop. (fig, 20)

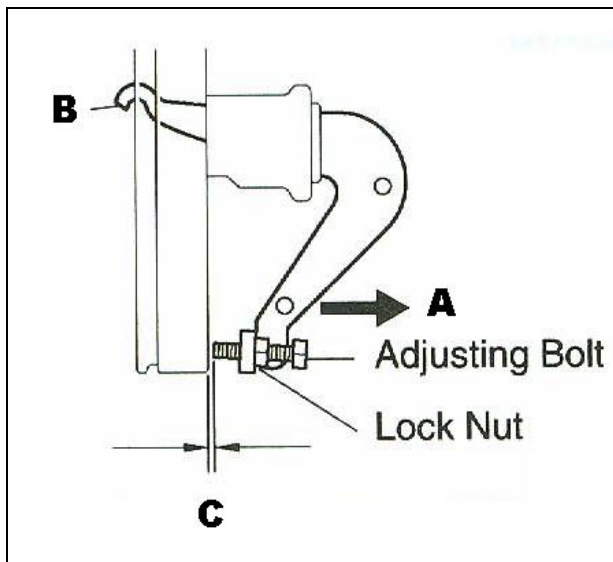


Fig. 19 Bellcrank stop adjustment

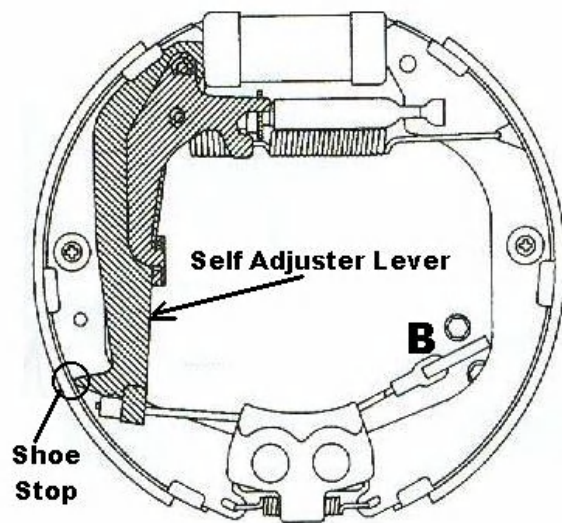


Fig. 20 Self-adjuster lever

- With the slack removed as described, the stop screw should be adjusted to have 0.016"-0.031" of clearance between the screw and backing plate C in figure 19.
- Reinstall the return springs and park brake cable.

If after this adjustment and the cable is reconnected the stop screws do not return to the backing plate, the cables are either seized or adjuster too tight. Check the cables for free movement through the sheaths. Replace any that are sticking. If none are sticking proceed.

- Find your trucks cable slack adjuster, usually under the drivers seat area, under the truck.
 - Back off this adjustment until the bellcrank stops are seated against the backing plate.
- At this point the brake shoe clearance should be adjusted. Reinstall the brake drum, to get the best adjustment the drum should be full seated and bolted in place. If you want to do this with the wheel off I suggest that you install at least 3 lug nuts with some washers behind them and snug them down to fully seat the drum. The truck must be in neutral to make the adjustment.
- Find the rubber plug on the backing plate that covers the star-wheel adjuster access hole, this is located just over the axle.
 - Using a screwdriver or a brake adjuster tool, insert it in the hole and pull up on the star-wheel, you should hear it click as it turns. (*fig .21*)

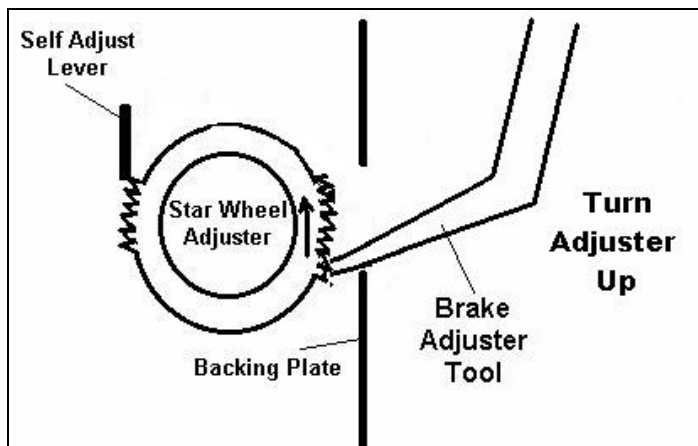


Fig. 21 Adjusting the shoes out

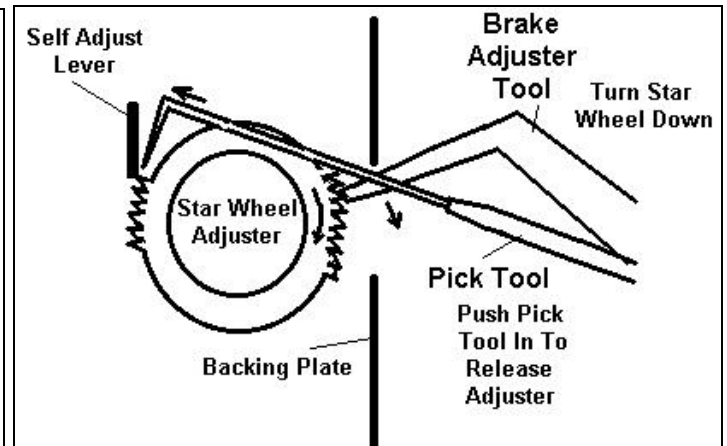


Fig.22 Adjusting the shoe back in

- As you adjust the shoes out, spin the drum and listen for the shoes to begin to make contact.
- At the point you hear the shoes, pull out on the bellcrank as far as possible and note the amount of clearance you have between the stop and the backing plate.
- The shoes are adjusted when you can feel a very slight drag and the bellcrank stop clearance when pulled is between 1/8" to 1/4".

Be careful not to over adjust the brakes. This can cause damage, as the shoes heat up they will get tighter. If you over adjust the shoes you will need to use a pick tool as in figure 22 to lift the adjuster lever off the star-wheel in order to turn the star-wheel in the opposite direction.

- After this is complete recheck the parking brake. Pedal should move 6-9 clicks - levers should pull 6-14 clicks. Adjust the cable slack if necessary.

I have prepared these instructions for use by members of the Tundra Solutions forum. I am an ASE certified Master Technician with over 30 years of mechanical experience. I have also spent over 20 years as a brake and suspension service specialist. All information listed is accurate to the best of my knowledge. I cannot control the results of the shown modification and therefore cannot be held liable for the results in any way. By you doing this modification you solely take full responsibility for the outcome. It is highly recommended that a trained professional do this work.

All specifications and some illustrations contained in this paper are taken directly form the 2001 Toyota Tundra factory service manual. If you have any comment or questions regarding any information contained in the paper please feel free to contact me through www.tundrasolutions.com I can be Privet Messaged under my screen name MEvang

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Mike G Evangelo 2009