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DIY: 98 V70 Brake Hydraulic Overhaul (Hoses, Seals, Parking)

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DIY: 98 V70 Brake Hydraulic Overhaul (Hoses, Seals, Parking)

by **cn90** Posted: **Mon Mar 28, 2011 9:02 am**

DIY: Brake Hydraulic System Overhaul (Brake Hoses, Caliper Seals/Dust Boots)

I just rebuilt my 1998 Volvo V70 Brake Hydraulic System Overhaul: Overhaul Brake Hoses, Caliper Seals/Dust Boots. While there I replaced the Parking Brake Shoes as well.

My experience shows that after 12-14 years/100-120K miles, the Brake Caliper Seals start to harden causing either fluid leakage *or* seized Calipers (uneven pad wear, rotor overheat ---> damage etc.). So at that age/mileage it makes sense to "refresh" the brake hydraulic system.

Volvo Caliper is made by ATE.

A. Brake Hydraulic Overhaul parts from rmeuropean.com:

- FRONT Brake Rebuild Kit (Seal, Dust Boot): **PN 271583; ATE (made in Germany); $13.40 x 2** (FRONT Caliper has only 1 piston; each kit has 1 seal, and 1 boot, enough for 1 caliper, you need 2 kits per car).

- REAR Brake Rebuild Kit (Seal, Dust Boot): **PN 270902; FTE (made in Germany); $14.40 x 2** (REAR Caliper has 2 pistons/caliper; each kit has 2 seals, and 2 boots, enough for one caliper; you need 2 kits per car).

- FRONT Brake Hoses; **PN 3546813; ATE (made in Germany); $12.20 x 2**

- REAR Brake Hoses; **PN 3516568; ATE (made in Germany); $11.25 x 2**

B. I also replaced the Parking Brake Shoes:

- TEXTAR Parking Brake Shoes; **PN 31262626; $32.90 x1**

- Hardware (this is optional). My experience shows that the Parking Brake Retaining Springs usually break after 13-14 years. I plan to keep this car for a while, so I used OEM hardware as I do not trust "Scan-Tech" hardware kit (PN 305550870 $15). I got all the hardware from a Volvo dealer online: http://www.trademotion.com/splash/index ... eid=213784.

You will need per car:
PN 1273836 x2
PN 9157979 x4
PN 3546028 x2

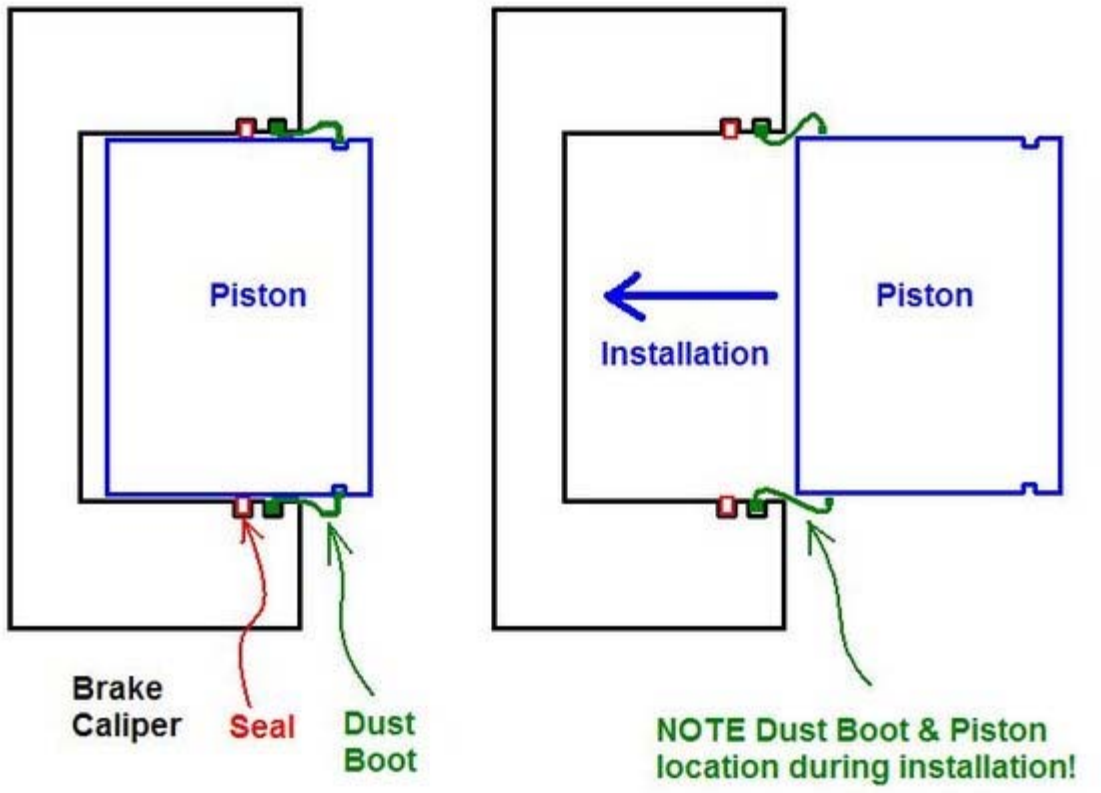
BRAKE HYDRAULIC OVERHAUL PROCEDURE

1. ALWAYS support car with jackstand before doing any work!

2. I use Valvoline Synthetic Brake Fluid.

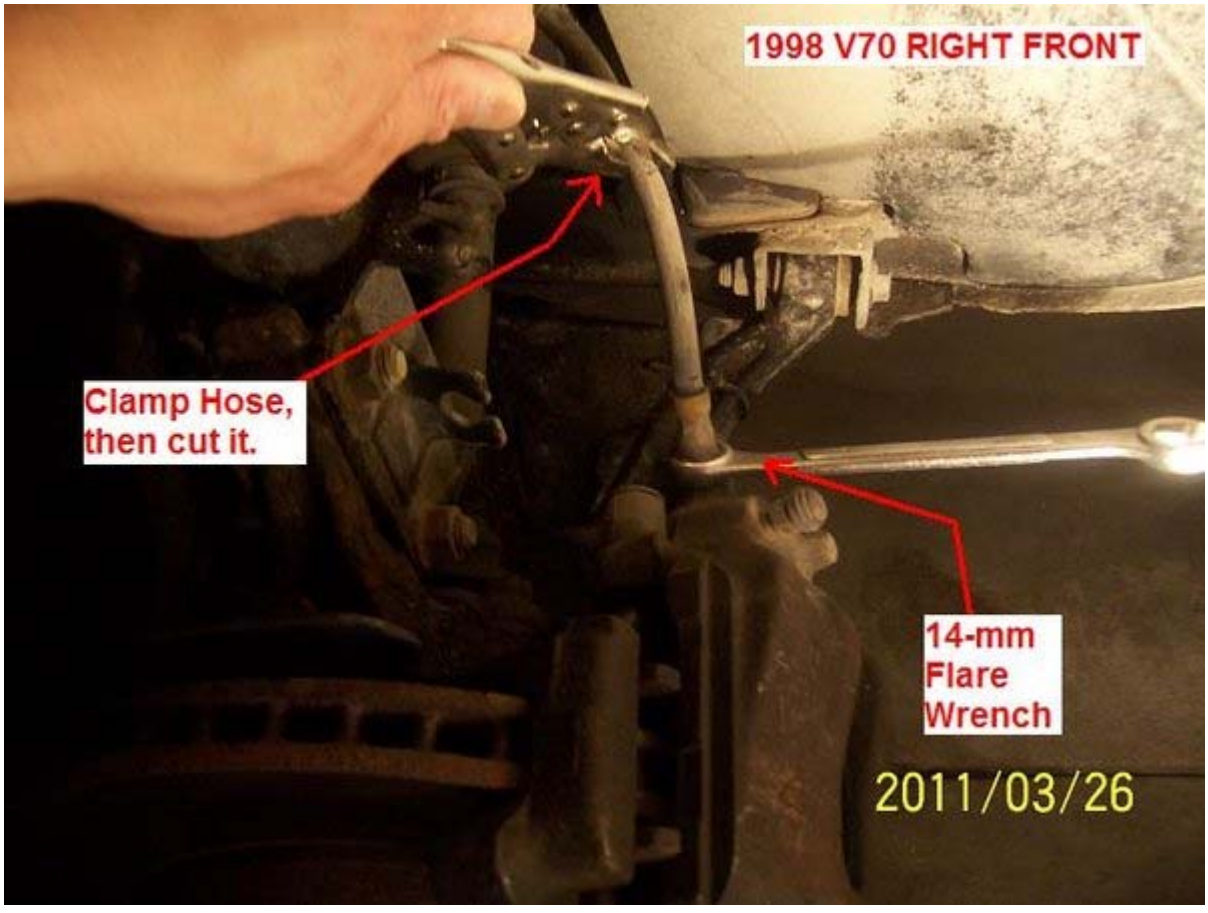
3. Clean the car the day before so all sand/dirt comes off.
- Dirt is No. 1 enemy when working on brake caliper rebuild. So: clean the outside (I used an old tooth brush) of the caliper before disassembly! Spray the outside with some WD-40, wipe it clean before doing any work.
- If you replace the brake hose (you should!), Spray the connection between the brake hose and metal line with WD-40 once the wheel is removed (car on jackstand); this allows the WD-40 to work into the brake hose and metal line connection while you do the caliper rebuild. This makes removal easier.
- Better yet, spray these connections 1-2 days ahead, these hoses/lines nuts/bolts seize after 13 years!
- Use flare wrenches!!!

4. STUDY Typical Brake Caliper Anatomy.
- The FRONT Caliper: INNER Groove for Seal, OUTER Groove for Dust Boot (The setup for REAR Caliper is a bit different, the Rear Dust Boot itself has a rigid OUTER lip).



5. Use air compressor with 15-20 psi to expel piston, no need for more pressure.
- Use a piece of wood to prevent piston from shooting out too far.
- As soon as you apply air pressure into the Brake Caliper (remove the brake hose first), the piston comes out.

6. Remove FRONT Caliper (7-mm Hex Socket); Clamp Hose and cut it.
You will need 11-mm & 14-mm flare wrenches as shown:



7. My FRONT Piston has a few very very fine scratch marks (you have to look very closely to see it).
- I buffed the piston shiny using "PlastX"; the same stuff you use to polish headlight.
- The nice thing about "PlastX" is that: it is very fine paste, maybe 10,000 grit or so.
- Then clean the piston and the Inside of the caliper with WD-40 and wipe it clean. Again, take care not to introduce any dirt inside.
- Wipe all areas clean with a clean rag. You may want to use a Q-tip (wrapped with cloth) to clean the 2 grooves (1 for seal, 1 for dust boot) really well.

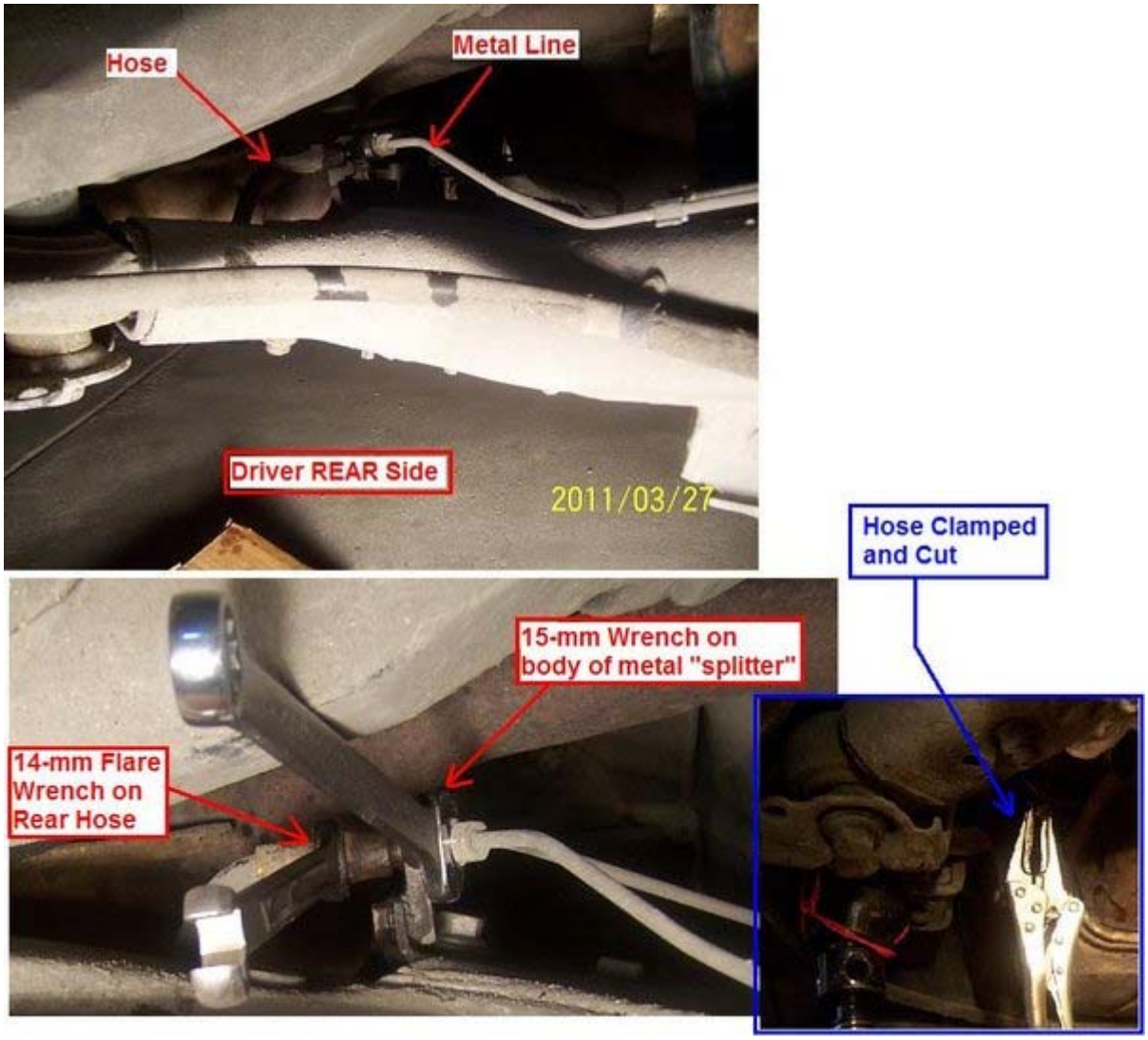
8. Now wet the new Seal with fresh brake fluid and place it in the INNER groove, taking care not to get any dirt in the bore.

9. Place the Dust Boot onto the Piston as shown in **Step #4 above**:
- Left Picture is the Anatomy during Normal Operation.
- Right Picture shows you how to place the Dust Boot during Installation of Piston: place the Dust Boot in the Caliper's Groove first then slide it into the Smooth Part of the Piston.
- Once the Piston is inserted, make sure the Dust Boot fits properly in the Caliper's Groove and the Piston's Groove.
- During Piston insertion, make sure the Piston is straight. If it is even slightly crooked, it won't go in.
I used my hand to push the Piston in. It is a bit stiff but it goes in.
If needed, you can use the Brake Tool to push the Piston in.
Another option is Channel-Lock Pliers to push the piston in.

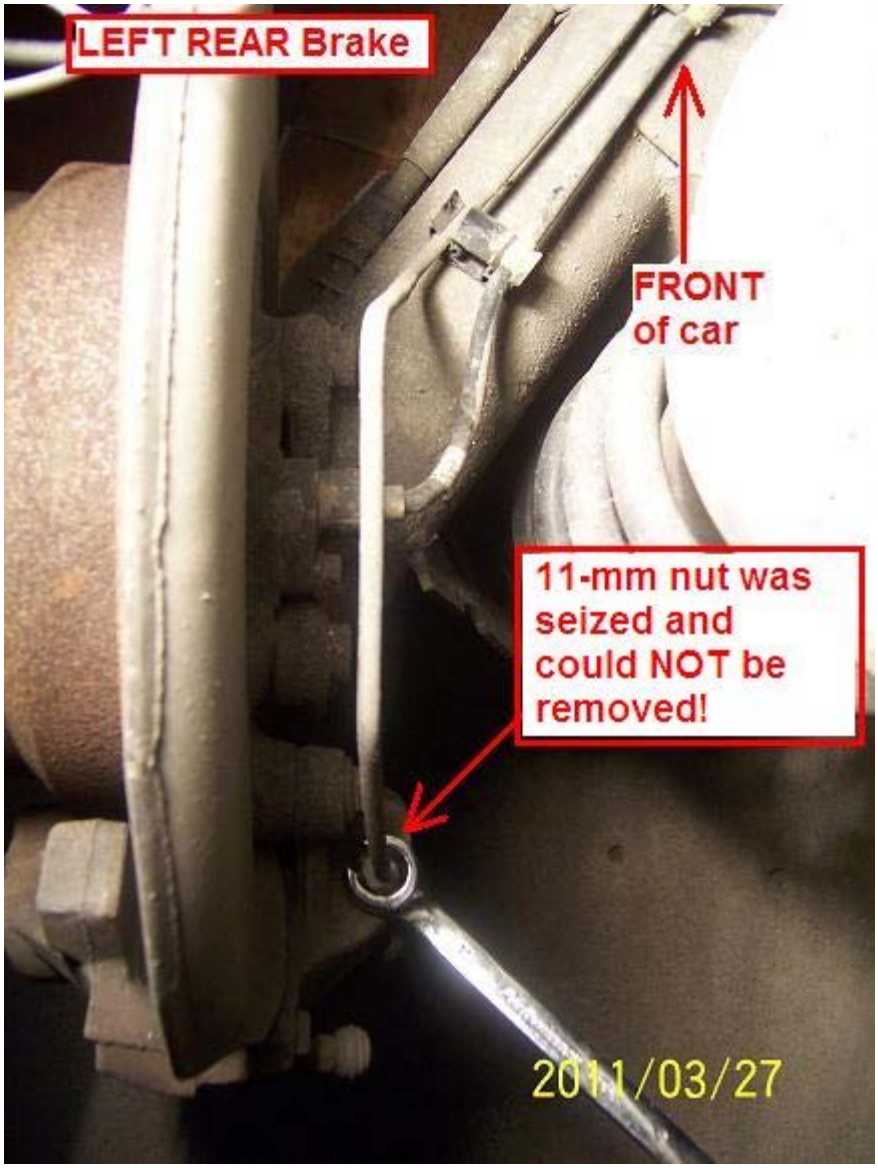
*** Always cover the open end of the hose with plastic and rubber band before install to avoid dirt from getting inside!

10. Next is Driver's side REAR Caliper. NOTE this hose feeds BOTH Rear Wheels.
So it makes sense to change this Driver REAR hose.
*** The other (Pass REAR) hose (laying on top of the Delta Links) is in a tight spot, nuts are seized in place, so I gave up on this hose!!! From what I gather, this hose does not flex and bend that much so it lasts virtually "forever".
So for practical purpose, just forget about this hose: if anyone has any trick for this hose, I'd be interested, but for now I gave up!

11. NOTE the "Splitter" where lines are fed to either REAR wheel.
Use a 15-mm wrench on the "Splitter" to hold it while you remove the hose.
Clamp and cut the hose.



12. The Driver's side REAR Caliper: the 11-mm nut is seized onto the Caliper, I almost rounded the nut. So I disconnect the metal line at the "Splitter".
Then apply compressed air into the metal line (using a vinyl hose) to expel the piston.

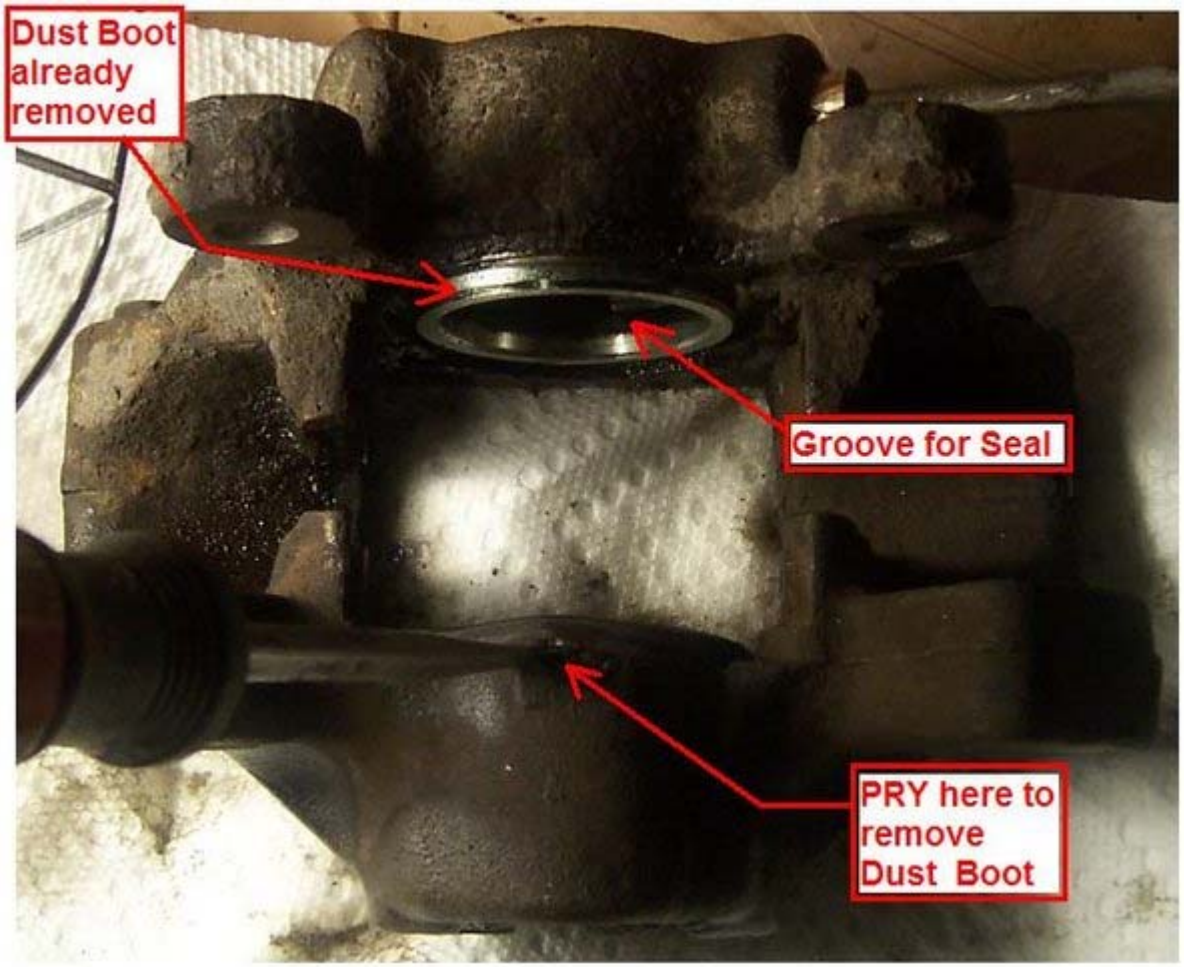


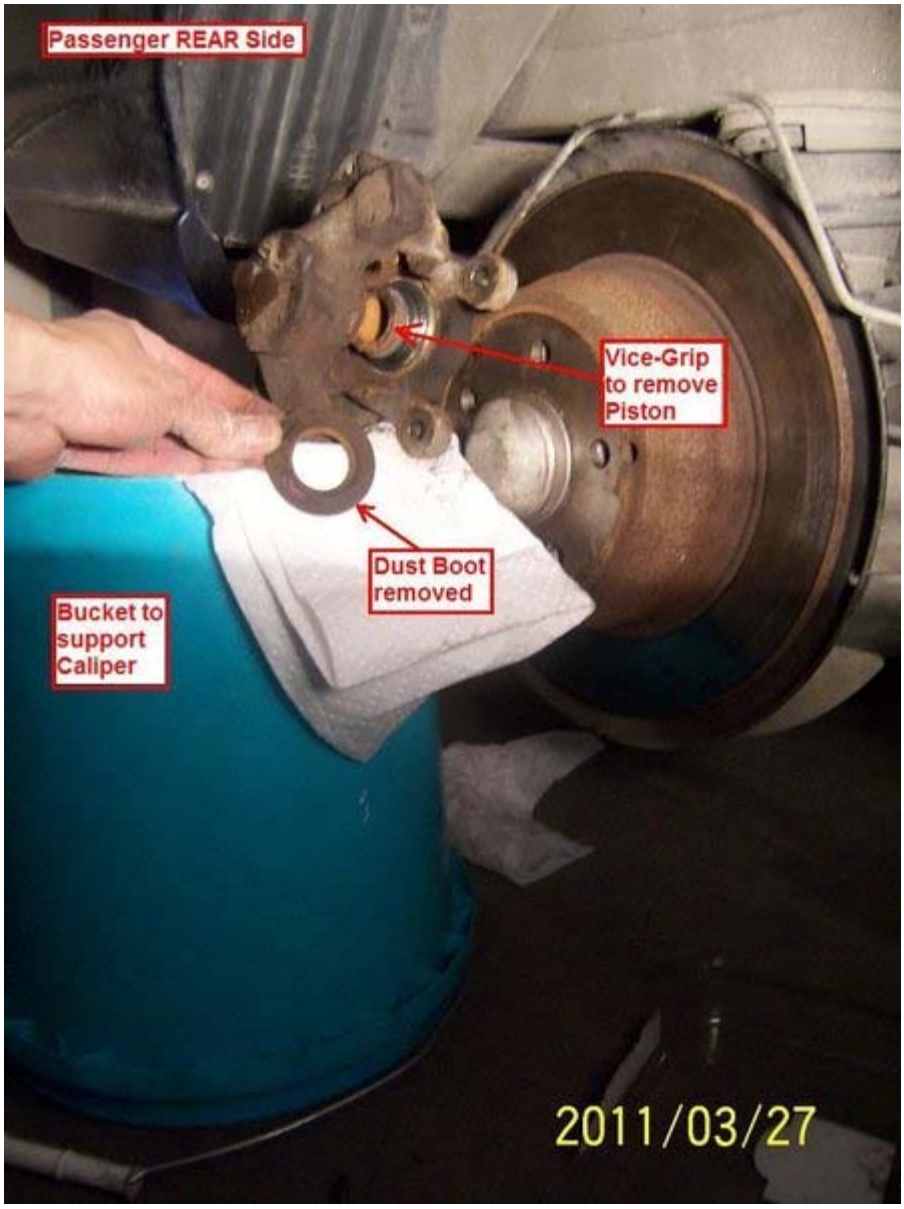
98VolvoBrakeOverhaul06.JPG (48.25 KiB) Viewed 8853 times

13. NOTE the REAR Caliper Dust Boot design is different compared with the FRONT.
Also the REAR Caliper has 2 smaller pistons (The FRONT Caliper has a single large piston).
The new Dust Boot fits snugly against the outer ring of the caliper. But may come off, so I applied a bit of Black RTV sealant ONLY on the area where the Dust Boot's OUTER ring meets the caliper metal ring, just a thin smear (use toothpick to spread it).
Do NOT allow RTV sealant comes into contact with the piston!

14. The Passenger's REAR Caliper was a nightmare.
- The hose laying on top of the Delta Links is in a tight spot, nuts are seized, so I could not remove it. In retrospect, leave this hose alone as it still looks good. Plus it is not subject to a lot of movement (like the FRONT hoses).
- The Metal Line at the Caliper also seized in place: I almost rounded the nut.
So I improvised: I loosen the metal line clips; then removed the Caliper (13-mm Bolts x2), and rest the Caliper on top on an inverted Bucket to replace the Seal/Boot!
- Now STOP and READ this: in order to stop the brake fluid leak once the pistons are removed; you need to clamp the Driver's REAR Hose. Use a piece of rubber hose as a cushion (to avoid damage to this hose), clamp this hose with a Vice-Grip.
- Without access hole for compressed air, it was a challenge! I used Vice-Grip and grab onto the

piston (Only grab on the part outside of the Dust Boot; do NOT grab the smooth surface where it contacts the Seal!) and rotate it while pulling it out. Do **1 piston** at a time!
- You may need to loosen the caliper's bleeding nipple to allow air in (to prevent suction effect), this way the pistons come out easier.





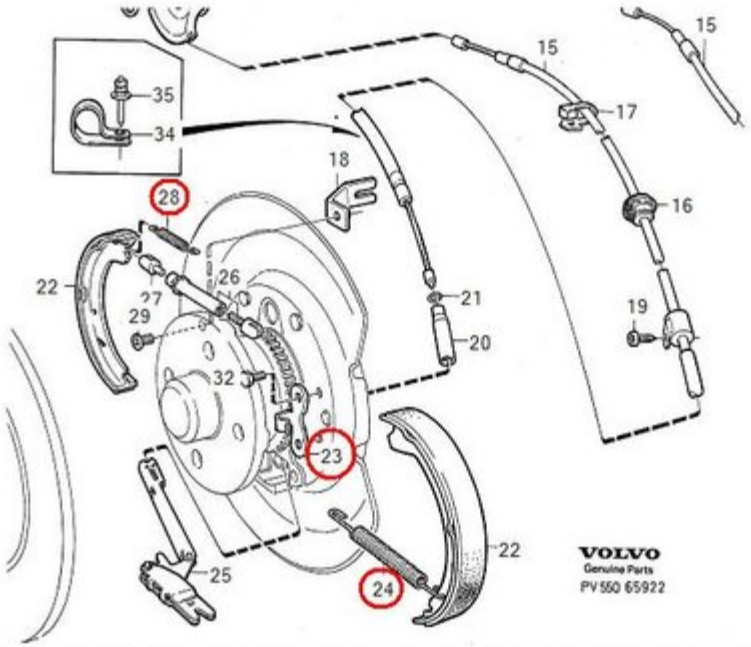
15. Re-install Brake Caliper, Brake Pads etc.
- Then bleed Brake System.
- I use my air compressor to bleed and wrote it up here:

DIY: 1-man Hydraulic Bleeding Kit for those with Air Compressor!
http://www.matthewsvolvosite.com/forums ... =1&t=29243

BONUS: Parking Brake Overhaul:

Parking Brake Thread by "Ozark Lee":
http://www.matthewsvolvosite.com/forums ... f=1&t=8187

This is the Parking Brake Part Diagram. I ordered all new hardware but in retrospect, you just need new springs (they tend to break after 12-14 years); NO need to change the retaining clips (PN 9157979 x4).



22	3516881	Brake shoe Show additional fitment information and product notes for 3516881	$ 17.81
23	9157979	Retaining spring Show additional fitment information and product notes for 9157979	$ 4.45
24	1273836	Return spring Show additional fitment information and product notes for 1273836	$ 7.17
25	3516885	Expander Show additional fitment information and product notes for 3516885	$ 177.02
25	9475812	Expander Show additional fitment information and product notes for 9475812	$ 28.19
26	3546001	Adjuster link Show additional fitment information and product notes for 3546001	$ 32.41
27	9157213	Claw Show additional fitment information and product notes for 9157213	$ 7.65
28	3546028	Return spring Show additional fitment information and product notes for 3546028	$ 5.81

Make sure you lube all these items before install.
- The Brake Shoe Adjuster
- The Brake Cable where it enters the wheel hub
- The Expander (attached to the Brake Cable)

During assembly, pay attention to the Start Adjuster so you know which way to expand the Adjuster (Basically UPWARD to expand the Adjuster). Then adjust the Brake Shoes as usual. Do this with Parking Lever (in the cabin) released.
Tighten the Star Adjuster until you **cannot** turn the rotor, then loosen it about 3-4 clicks. Now you can turn the rotor, a slight drag noise is normal. Now check the Parking Brake Lever, the REAR wheels should be locked before 7 clicks. Ideally between 4-7 clicks.

Then do a few "Brake bedding" for the Parking Brake. I think it is a few stops using Parking Brake at speed of 30 mph or so.
Find an empty stretch of the road to do this "bedding" thingy!

Congrats, you just saved close to $1000 of labor charge!

Re: DIY: 98 V70 Brake Hydraulic Overhaul (Hoses, Seals, Park

by **matthew1** Posted: **Mon Mar 28, 2011 11:08 am**

WOW, this is super. I especially love the 3D "Place Piece of Wood Here" illustration in the photo!

On behalf of the legions of future users of this tutorial (probably me in 10k miles or so), thanks CN90. This is going in the VRD today.

Re: DIY: 98 V70 Brake Hydraulic Overhaul (Hoses, Seals, Park

by **jtp** Posted: **Mon Mar 28, 2011 11:36 am**

I'm going to be doing this at the end of the summer. Thanks for all the detail, helps me out a lot.

Re: DIY: 98 V70 Brake Hydraulic Overhaul (Hoses, Seals, Park

by **cn90** Posted: **Mon Mar 28, 2011 12:26 pm**

I forgot to mention the reasons for doing this DIY:

- My 1998 V70 has 110K and after thousands of twists and turns and bending of the brake hose, the Front hoses crack at the Caliper side. This is because the hose is flexed back and forth the most at that location.

- If you do an Internet search, you will see that brake hydraulic pressure can go up to **800-1800 psi** during a brake stop.
It is a lot of pressure and when the hose is cracked, it is a matter of time until you lose all braking effect!

- I used to have a 1983 BMW 735i with the same caliper made by ATE: after 14 years/120K miles, the caliper seized causing damage to the rotors (almost red hot) and pads. Then I had to replace NOT ONLY the Caliper, but ALSO the pads and rotors! It was costly.

- By rebuilding the caliper, it is cheap ($14 for each caliper rebuild kit), easy (except for dealing with the seized nuts/bolts), and cost-effective (you prevent potential damage to the rotors/pads).

- The worst part about this job is dealing with seized nuts/bolts as mentioned above.

Re: DIY: 98 V70 Brake Hydraulic Overhaul (Hoses, Seals, Park

by **cn90** Posted: **Mon Mar 28, 2011 5:19 pm**

Another Note on seized nuts and bolts: whenever you see the metal line with the nut, expect it to seize after years in service.

So:

- Spray WD-40 to areas that you will work on a few days ahead, then spray WD-40 again on the day of the work.

- A professional mechanic told me that as a last resort, use a vice-grip to grab the metal line nut because the vice-grip has better grip than a flare wrench; but in the process of using the vice-grip, you will destroy the nut.
---> Now you need not only the nut BUT ALSO new metal line (because the end of the metal line is

flared!).

- So do whatever you can to avoid this situation. I am glad I did not push too far to cause damage to the nut: instead I rebuilt the caliper with the metal line still attached, it is more difficult but manageable!

- I still gave up on the hose running on top of the delta link.
The space is so tight and the nuts are seized!

Re: DIY: 98 V70 Brake Hydraulic Overhaul (Hoses, Seals, Park

by **polskamafia mjl** Posted: **Mon Mar 28, 2011 7:04 pm**

Great work, CN90!

Re: DIY: 98 V70 Brake Hydraulic Overhaul (Hoses, Seals, Park

by **db130** Posted: **Wed Mar 30, 2011 9:35 pm**

if you have access to a MAPP gas handheld torch, heat up the rear calipers around the 11mm nut on the metal lines. you don't have to worry about rounding off the nut and would save you big headaches.

Re: DIY: 98 V70 Brake Hydraulic Overhaul (Hoses, Seals, Park

by **cn90** Posted: **Thu Mar 31, 2011 9:44 am**

> *db130 wrote:*
> if you have access to a MAPP gas handheld torch, heat up the rear calipers around the 11mm nut on the metal lines. you don't have to worry about rounding off the nut and would save you big headaches.

Thanks,

The pro mechanic just told me the same thing. I do my plumbing at home so I am familiar with Propane vs MAPP gas.
Here are my questions:

1. I only have the Propane Bottle (the stuff plumber uses to solder copper pipes).
It is probably enough heat? Yes No?

2. How long to heat, in other words, do you have to heat it until it is red hot?
I am thinking maybe only 15 seconds of heat or so just to loosen the rust, no need to get red hot.

3. Do you need to open the bleed nipple to release pressure because of the heat build-up from the Propane (or MAPP)?

Re: DIY: 98 V70 Brake Hydraulic Overhaul (Hoses, Seals, Park

by **cn90** Posted: **Fri Apr 01, 2011 8:33 am**

I forgot to mention that during installation of new brake hose, you MUST install the hose on the Caliper side first.

Tighten it to torque (I don't know the torque but basically snug it, then add firm twist of 30 degrees or from lets' say 3 o'clock ---> 4 o'clock positions).
Then install the hose side where it mates with the metal line nut.
There is no other way around it.

Re: DIY: 98 V70 Brake Hydraulic Overhaul (Hoses, Seals, Park

by **cn90** Posted: **Thu May 05, 2011 9:47 am**

Follow-up,

I just did the same thing (Brake Hoses Overhaul) on my 1998 BMW 528i, which is very similar to my V70 as the brake system is made by the same company (ATE).

Anyway, same issue came up, could not undo the brake line at chassis, so I decided to use HEAT! It made life 1,000,000 times easier!

See **Step #13 here**:

http://www.bimmerfest.com/forums/showth ... p?t=538290

Attached is a pic of using Propane Torch for 10-15 seconds. The idea is: any connections has a "Bolt" and "Nut" part.
Seizing happens when the "Nut" part constricts too much on the "Bolt" part.
So the idea is to heat the "Nut" part for about 10-15 seconds just to expand it.
And it worked!!!

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