Hydraulic Brake Tutorial Summary Notes

General Tips

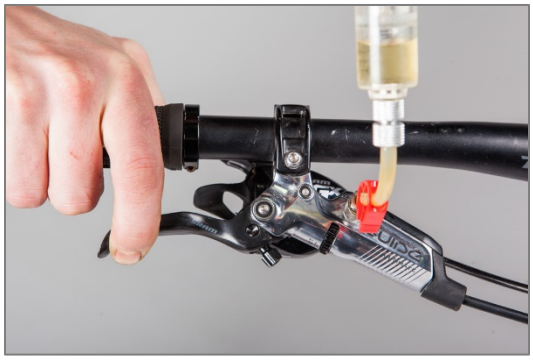
- Remove threaded pad pin and replace with cotter pin if bike being used in winter.
- Shimano pads are notorious for squeaking; sanding is first thing to try; if this doesn't work, replace with Jagwire pads.
- 200/220 grit paper works best when sanding pads.
- Pads thoroughly soaked in oil/DOT fluid should be replaced; they can sometimes be salvaged by burning off oil with a torch.
- If rotors are dirty or contaminated, they can be sanded while on while or cleaned with dish soap and water, then rinsed, sanded, etc.
- If calipers are leaking, it's often best to replace them.
- DOT fluid shouldn't be feared but must be used safely; it will burn if left on skin.
- Brakes can be bled while calipers are connected to the bike or removed; if leaving attached to bike, you must remove wheel.
- Leaving calipers attached to the bike keeps your hands freer, but it can be harder to access and manipulate parts.

Bleeding SRAM and Similar (NOTE: SRAM uses DOT fluid)

Prep and Cleaning

- Remove pad retaining pin (be careful not to strip threaded pin heads) and pads.
- Insert a bleed block of the right thickness to allow piston(s) on one side of caliper to extend out while holding other side's piston(s) in; you can also use a plastic tire lever or similar.
- Squeeze lever to expose piston(s) sidewalls on one side of caliper; go slowly to avoid piston(s) from popping fully out.
- Clean pistons with isopropyl alcohol or similar (Clean Streak for example). A Q-Tip works very well for cleaning.
- Lube pistons with DOT fluid and press back into caliper (plastic tire lever works well) and insert a full-sized block to hold them flush with caliper.

Bleeding



- SRAM uses 2 syringes to push fluid back and forth between the caliper and brake lever.
- Ensure caliper is lower than lever and hose is not kinked.
- Fill syringes with appropriate DOT fluid; top syringe should be about 1/3 full and bottom about 2/3 full.
- Loosen caliper port *slightly* with a hex wrench (likely 4 mm) and attach syringe.
- Loosen level port and attach syringe.
- Syringes do not need to be tightly attached; use a light touch!
- Wrap a rag around the lever syringe protect against spills.
- Start by pressing fluid out of the caliper syringe. The lever syringe plunger can be pulled *slightly* to add light vacuum.
- When most of fluid has passed into the lever syringe, reverse the process by forcing it back into caliper syringe; repeat several times.
- After several passes, air bubbles should have stopped flowing upwards into lever syringe; close lever valve (doesn't need to be very tight) and push a bit more on caliper syringe to ensure the system full of fluid.

Finishing Up

- Squeeze lever firmly with block in; should feel tight.
- Tighten caliper fluid port *lightly* (often uses a 4mm hex wrench).
- Clean off caliper, hose, and lever with isopropyl alcohol or similar.
- Install pads in caliper and secure.
- Optional: put in a thinner block (approximate thickness of your rotor) and squeeze lever to centre pads in the caliper.
- If pads are thin (and replacement is not an option) you can allow the pads out slightly in the caliper by either using a thinner block or no block (in which case be very careful not to overextend) and then performing bleed as above.

Bleeding Shimano and Similar (NOTE: Shimano uses Mineral Oil)

Shimano Notes

- Shimano makes different sized bleed blocks; make sure you use the correct one for your caliper.
- Shimano uses a little funnel cup that attaches to the brake lever when bleeding the system.
- Most new Shimano brakes have lever with 1 fluid port that is opened with a 2.5mm hex wrench; the funnel cup attaches to this port.
- Less commonly, some older Shimano have lever covers that need removing to access fluid port; these do not use the funnel cup.
- Shimano uses a single syringe and is always a one-way bleed.
- Rubber cap on caliper port is not essential.

Prep and Cleaning

- Same as SRAM procedure above but **lube pistons with mineral oil, not DOT fluid.**

Bleeding

- Insert correct bleed block size into caliper.
- Remove fluid port screw on lever and attach funnel cup; remove plunger plug from funnel.
- Fill syringe with mineral oil and connect to port on caliper; loosen caliper port hex bolt ¼ to ½ turn.
- Squeeze syringe to force fluid up into hose, to the brake lever and out into the funnel; fluid in the funnel may be very dark and dirty.
- Squeeze the lever to help work out bubbles and pull in more fluid. The resistance/firmness should feel about the same as a well-adjusted brake being engaged.
- When the oil entering the cup is clean and bubbles have stopped flowing, plug and remove the funnel.
- Replace the lever port plug bolt; tighten caliper bolt (snug but not too tight!) and remove syringe hose.

Final Shimano Tips

- In a pinch, you can do a 'quick and dirty' job (though this is not proper): install lever cup, pour in a small amount of mineral oil and squeeze the brake lever firmly several times.
- If it still seems like there is air in the system following a bleed, remove any zip ties or hose ties and thoroughly tap the hoses with a wrench from caliper to lever.

Other brands of hydraulic brakes

Most other brands of brake follow either the SRAM or Shimano procedures. You will need to use the correct syringe connector tip for the system you're bleeding, but otherwise the procedure is largely as described above. The chart below shows what fluid to use for different brake brands. If in doubt, double check procedure and fluid before starting.

Brake Manufacturers and their Choice of Fluid*

Manufacturer	DOT Fluid	Mineral Oil
Avid	✔	
Bengal	✔	
Clarks	✔	
Formula	✔	
Giant	✔	✔
Hayes	✔	
Hope	✔	
Magura		✔
Quad	✔	
Shimano		✔
Tektro		✔

** Reference only. Always check your manual before selecting the appropriate fluid for your brakes.*

Hoses and Connections

If setting up a new system you may need to cut hydraulic hose to length and connect it to the calipers and levers. Each brake manufacturer does require that you use a specific type of hose (Shimano uses Shimano specific hose, etc.) Hose can be cut carefully with a very sharp knife, but it is best to use a hose cutting tool. The caliper end of the hose typically connects with a banjo bolt that is pre-attached to the hose. The lever end, however, requires that you connect it using an olive and barb. The barb inserts into the hose, and the olive is compressed when the hose is screwed into the lever causing it to flair and lock against the hose which is supported by the barb within. Some barbs are installed with a special tool but they can be pressed into the hose using yellow blocks secured in a vise and a rubber mallet.

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