

Trapping Sludge - A Simple, Inexpensive, and Efficient Two-Stage Sink Trap

This handout started out as one of my Tool Times columns in Clay Times Magazine in 2001. It was inspired by requests on the Clayart Internet discussion forum for instructions to build a simple and inexpensive clay trap. I have built a number of these trap system since then, and in the process have drastically improved the design. I've incorporated that information here and have clarified the instructions.

Do You Have A Septic System?

What's in the waste that goes down the sink drain in your studio? Most of it is clay, along with some heavier particles of glaze materials. In household plumbing without a proper trap system, this material will settle in standard sink trap and the sewer pipes, eventually blocking off the outflow. The two-stage trap described below will handle most of this material without any trouble. However, anyone who has ever made terra sigillata knows that the finest clay particles remain in suspension for days, and thus will pass through the trap and into the plumbing system. On city sewer systems this is of little concern, but on septic systems it is a serious problem.

Farmers and ranchers line agricultural holding ponds with Bentonite or ball clay. Water seeping out of the pond carries the clay with it, and the clay naturally seals the pores in the soil and rock, stopping the leaks. Even a very small fraction of ultra-fine clay in your studio sink outflow will remain in suspension through the septic tank and will seal the pores in the soil along your leach field, rendering it inoperable in remarkably short order. I've seen this happen.

If you are on a septic system, ***do not connect your studio drain to the septic tank***. Instead, set up a greywater seepage pit or trench that can periodically be maintained by shoveling out the clay sludge. Don't be squeamish about discharging the greywater in this way. Particles of all glaze materials are like big boulders in comparison to clay particles, and will settle in the trap. What exits the trap system will be almost entirely clay, harmless to the environment.

Tools and Parts Required for Two-Stage Plumbing Trap

- Hacksaw to cut the plastic pipe
- Caulking gun with a tube of silicone caulking
- Electric drill and a 2" hole saw to cut holes in the 5-gallon buckets. You can also use a 3/8" drill bit and a saber saw with a fine-tooth blade.
- 2 sturdy 5-gallon plastic buckets with lids (get ones with the horizontal reinforcing ribbing located as high as possible beneath the rim – the white food-grade 5-gallon buckets from Lowe's work very well and have tight-sealing lids)
- 24" of 1½" PVC white plastic drain pipe. If the options are 10' lengths and short sections, just get two 12" lengths. If you're plumbing in a new sink, you'll need more of the 1½" pipe anyway, so get the 10' length.
- 4 – 1½" PVC elbows (female sockets both ends)

Tools and Parts Required for Two-Stage Plumbing Trap, Continued

- 1 – 1½" PVC coupling (female sockets both ends)
- 3 – 1½" PVC unions (female sockets both ends)
- 1 – 1½" PVC slip-joint sink trap adaptor (female socket)
- Appropriate cleaner and glue to join the PVC pipe fittings (the two containers generally come together in a set)
- A sheet of sandpaper
- Paper towels
- Sharpie permanent marker

All of the holes referred to below are 2"-diameter to fit the outside diameter of the 1½" plastic pipe. By far the easiest way to create the holes is with a 2" hole-saw in an electric drill. An alternate method is to draw a 2" circle, drill a 3/8" hole just inside the circle, insert the saber saw blade and cut the larger hole. Use a round file or some coarse sandpaper to finish the holes.

Most sinks normally utilize a J-shaped trap to prevent sewer gases from coming up through the sink drain. You will only be using the straight vertical pipe part of the trap assembly that attaches directly to the sink drain. The PVC slip-joint sink trap adaptor will fit over that pipe.

Cutting the Holes

- Cut a hole in the lid of the first-stage bucket centered 4" from one edge.
- In first-stage bucket, cut a hole in the bucket wall directly beneath the horizontal raised reinforcing ribs, leaving ¼" of clearance between the edge of the hole and the lower edge of the raised ribs.
- In the other bucket, the location of the holes depends on your installation. If you have an already-present wall-connection for the sewer, then it might be more convenient to have one hole in the side of the second-stage bucket to connect to the first stage bucket, and the second hole 90-degrees around on the back side of the second-stage bucket to shorten the distance to the wall connection. If you are installing an entirely new sewage or grey-water connection, then just cut the two holes on opposite sides of the bucket.
- Make sure all three holes in the bucket walls are cut at the same height, with ¼" clearance beneath the reinforcing ribs.
- The first-stage bucket is the one with the hole in the lid and a single side hole. When the system is complete, this bucket will be placed directly under your sink drain.

Initial Preparations

- With the hacksaw, cut four 1½"-long pieces of the 1½" PVC pipe, plus two 3" pieces and one 5" piece. Sand the burrs smooth on all ends.
- Open the containers of cleaner and glue, but leave the lids with attached swab applicators set in place atop the containers. The glue is extremely volatile, and if you leave the lid off, the solvent will evaporate quickly and the glue will go bad and will also harden on the swab applicator. Always set the applicators back in the appropriate containers immediately after each use.
- Make sure that all the connecting surfaces on pipe pieces and the fittings are clean and dry.
- Disassemble all three of the unions. Note that the male half of the union is threaded, while the female half has two parts, with a rotating collar nut which threads onto the male half. Set aside

the female half of each union that includes the rotating threaded collar nut. Don't use the female halves until they are specifically called for.

Initial Pre-Assembly

- Get out the sink trap adaptor and one of the short lengths of pipe.
- Apply cleaner and then glue inside the 1½" socket on the sink trap adapter and outside one end of the short piece of pipe.
- Immediately press the parts together with a twisting motion.
- Wipe away excess glue with a paper towel and set the piece aside to cure.
- Get out three of the PVC elbows and the other three short lengths of 1½" pipe, and one at a time, do the same as described above and glue a short length of pipe into one socket on each of the three elbows.
- Wipe away excess glue with a paper towel and set the pieces aside to cure.

First-Stage Lid Assembly

- Get out first stage lid, the sink-trap adaptor, and the 1½" PVC coupling.
- Insert the protruding length of 1½" pipe on the sink-trap adaptor through the hole in the lid of the first stage bucket, with the sink-trap adaptor on top of the lid.
- Apply cleaner and then glue to the surface of the pipe and one socket on the coupling
- Poke the short pipe section through the hole in the lid, with the sink-trap adaptor on top of the lid, and immediately attach the coupling below the lid, joining them with a twisting motion ***with the coupling on the underside of the lid and the sink-trap adaptor on top.***
- Get out the 5" length of pipe and apply cleaner and glue to one end of the pipe and to the other socket on the coupling under the lid. Immediately attach the two pieces with a twisting motion.
- Get out the unused elbow, and apply cleaner and glue to one socket on the elbow and the lower end of the 5" pipe, and join them as described.
- Get out one of the 3" lengths of pipe. Apply glue to one end of the 3" pipe and inside the other socket of the elbow, and join them.
- Set the lid assembly aside to cure.

First-Stage Bucket Side Connection

- Get out one of the male union halves (the half without the rotating collar nut), and one of the elbows with the short length of pipe attached.
- Apply cleaner and then glue to the pipe and the 1½" socket on the union half.
- Immediately insert the pipe through the side hole in the first-stage bucket with the elbow on the inside of the bucket and join the parts, with the elbow inside the bucket and the half union outside the bucket.
- Set aside to cure.

Second-Stage Bucket Side Connections

- Get out the last two elbows and the other two male union halves (the halves without the rotating collar nut).

- Apply cleaner and then glue to the end of the pipe and the socket on the union half.
- Immediately insert the short length of pipe on one elbow through one of the side holes on the bucket, with the elbow on the inside of the bucket and join to the male half union, with the union on the outside of the bucket.
- In the same fashion, install the other elbow and half union in the other hole.
- Set aside to cure.

First-Stage-Second-Stage Connector

- Get out two of the female union halves with the rotating collar nut, and the other 3” piece of pipe.
- Make sure that the rotating collar nuts remain in place on the union halves while doing this assembly. If you forget and assemble the halves to the pipe without the rotating collar nuts in place, there will be no way to put them on and you will have to purchase new parts.
- Apply cleaner and then glue to one end of the pipe and to the socket on the union half, and join the parts.
- Install the other union half on the other end of the pipe.
- Remove excess glue with a paper towel and set the part aside to cure.

Sealing the Connections on the First-Stage Lid and Both Buckets.

- Place the tube of silicone caulking in the caulking gun, remove the cap, and snip off the tip with wire cutters or scissors. Replace the cap on the tip. Remove the cap each time you apply the caulking, but always replace it immediately.
- Place the lid loosely on the first stage bucket.
- Rotate the pipe until the horizontal pipe extension at the bottom swings around to touch the wall of the bucket and back it off just a bit. Note whether it is pointing clockwise or counter-clockwise as you look down at the top of the bucket. With the Sharpie, boldly mark the base of the trap adaptor and the surface of the bucket with registration lines so you can retain this position when the caulking is applied.
- Remove the lid and set it aside, and on the wall connection, rotate the elbow so that it is pointing sideways in the same direction as the inlet pipe. In other words, if the extension pipe and elbow on the bottom of the inlet pipe point in a clockwise direction, make sure that the outlet elbow also points in a clockwise direction. On the outside of the bucket, mark the surface of the bucket and the union half with bold registration marks to make sure you retain this position when the caulking is applied.
- Generously apply silicone caulking to seal around the pipe passing through the wall of the bucket, both inside and outside the bucket, making sure the elbow stays in the correct position.
- Generously apply silicone caulking to seal around the sink trap adaptor and the pipe beneath the lid. Apply caulking on both sides of the lid around the fitting and pipe. Make sure that the inlet pipe elbow and outlet pipe elbow are both pointing in the correct direction.
- Set the lid in place offset so that it does not close the opening, but is sitting level with the pipe hanging down vertically beneath the lid. This will allow air to circulate in order for the silicone to cure.
- Repeat this process to seal both connections on the second-stage bucket. Again, apply caulking to the connections both inside and outside the bucket. Rotate the inlet elbow so it points to the side (either direction), and rotate the outlet elbow so that it points downward. If the elbows are

directly opposite one another, then it doesn't matter which is which, but if you have mounted them 90 degrees apart for a rear connection, then it does matter.

- Give all the caulking 24 hours to cure.

Installing the Lids

- Once the silicone is completely cured, put the first-stage lid in place so that the inlet pipe is directly opposite the outlet elbow (on the opposite side from the outlet elbow).
- Once you have ensured the above position, use a rubber mallet or block of wood to hammer the lid in place so that it is thoroughly sealed.
- Hammer the lid in place on the second-stage bucket.

Installation of the Sink Trap

- Normally, the straight pipe already in place extending down from the sink drain is at least six inches long. If it is shorter, you may need to get a replacement. At any good plumbing supplier you can buy that part by itself.
- Loosen the collar nut beneath the sink connection and remove that pipe.
- With the collar nut still on the pipe, insert the pipe in the sink trap adaptor atop the first-stage bucket. You may have to loosen the nut on the adaptor in order to get the pipe to fit in.
- Set the first stage bucket on the floor beneath your sink (or on the floor of the cabinet beneath your sink)
- Slide the vertical pipe upwards and see if it will attach to the sink drain connection while still partially inserted in the sink-trap adaptor. If it will, you are good to go without any further modifications in placement of the first stage.
- If the pipe pulls out of the sink-trap adaptor on the bucket, or if the bucket needs to be mounted higher in order for the outlet on the second bucket to be an appropriate height for the sewer connection, then you will have to raise up the bucket with bricks or with a custom stand. For my current studio, I purchased a PVC laundry sink from Lowe's, and built a simple stand with 2x4s to raise the buckets so that the second stage outlet would be high enough. Both buckets must be at the same level.
- If this trap is being hooked up to an already-present wall connection for the sewer, then you will need to purchase the necessary pipe and fittings to span the space between the second-stage outlet and the wall hookup. If it is a very short connection, it can be level, but if it is a longer connection it must slope downhill very slightly. Under no circumstances should it ever slope uphill from the second-stage outlet to the wall hookup.
- If you have a sink cabinet with a raised floor, there might not be enough space for the installation as described above. If that is the case, you will need to cut the floor out of the sink cabinet to accommodate both buckets.
- Once the first stage bucket is located satisfactorily, slide the vertical pipe upwards and reattach it to the sink drain, tightening it securely, and then tighten the nut on the sink-trap adaptor atop the bucket.
- Attach the first-stage-second-stage connector to the male union half on the first-stage bucket.
- Put the second-stage bucket in place and attach the connector. Tighten both union nuts securely.

- The last female union-half with rotating threaded collar will be attached to the sewer or grey-water pipe connection.

Using the Trap System

- Once the trap is connected to the outflow sewer pipe, run the water until the trap system is full in order to make sure there are no leaks. As long as you have been thorough in applying the silicone caulking and have tightened the connector nuts adequately, there will be no leaks.
- In operation, the waste flows down the vertical pipe from the sink, but you do not want it to disrupt any accumulated debris settled in the first-stage bucket. The elbow and pipe extension on the bottom of that pipe prevents that by diverting the water to the side so it flows gently around the circumference of the bucket. The outlet elbow pointing in the opposite direction ensures that the outflow has maximum opportunity for sediment to settle as it passes through the bucket, and the same with the second-stage bucket. The downward pointing elbow on the second-stage outlet creates an airlock to prevent sewer gas from entering the trap if you are connected to a city sewer system.
- Whenever using a trap system, it makes sense to minimize the debris that flows down the sink drain. If you are working on the potter's wheel, let your water bucket sit overnight, pour off the water in the morning, and put the slurry in recycle. Rinse clay from your hands or tools in a separate bucket in the sink, and once again, let the clay settle in the bucket overnight and then pour off the water and put the slurry in recycle. If you do this as a regular routine, it will be a very long time until the buckets need to be cleaned. When you are working with glazes or glaze materials, just rinse your hands or implements in the sink and let the trap system do its work.

Cleaning the Buckets

- Eventually you will no doubt have to clean the buckets.
- Disconnect the rotating collar nut at the sink drain connection.
- Loosen the rotating collar nut on the sink-trap adaptor atop the lid and slide the sink pipe downwards.
- Unscrew the union collar nuts on the connector between the buckets.
- Unscrew the union collar nut on the second-stage outflow connection.
- Keep in mind that some water will spill out the side connections as you move the buckets. If this is a serious issue, purchase three more 1½" PVC unions and three 1½" PVC male pipe plugs. Disassemble the unions and throw away the male halves and retain the female halves with the rotating threaded collar. Apply cleaner and glue and install the pipe plugs in the pipe sockets on the three female union halves. Keep these three union halves in a place where you can find them. When you disconnect the connector pipe between the two buckets and the second-stage outflow connection, there will still be a bit of spillage, but as soon as you move the buckets even slightly you will be able to install the three accessory union halves on all the bucket side connections to prevent any further spillage.
- Carry the buckets outside, remove the lids, and clean out the sludge.
- When you reassemble the system, make sure you install the first-stage lid so that the inlet pipe is directly opposite the outlet elbow. Some Sharpie registration marks on the lid and bucket would be a good idea.
- Please dispose of the sludge in a responsible fashion. The best way to do that is to dry out the sludge, place it in a bisque-fired bowl, fire it to bisque-temperature, and put it in the trash.