SedPoint2 – Temporary or Semi-permanent sediment pore water sampling systems.

These are based on the simple and extremely effective MHEproducts "TubeWells" which are constructed of ¼" polyethylene tubing, perforated at their ends, and fitted with a 54 thread per inch polypropylene fabric screen (same as in our ScreenSoks). The screen length can be 1" to 7.5" long, depending on the customer's applications. These versatile microwells can be used for long-term monitoring of pore water, porewater investigations, soil gas investigations and monitoring, or as tools for the injection of liquid or gaseous tracers. The original SedPoints were constructed with a polyethylene tip. The design evolved to incorporate the conical stainless steel tip now used on the SedPoint2, which not only facilitates inserting them into the ground, it is rugged enough so that the SedPoint can be reused (frequently) after cleaning.


Figure 1: Here's a bundle of a dozen of the 7' long original "SedPoints" with bare tips.

The tips on the original SedPoints were either bare polyethylene (same as TubeWells) or capped with a thick polyethylene tip as shown in Figure 2.

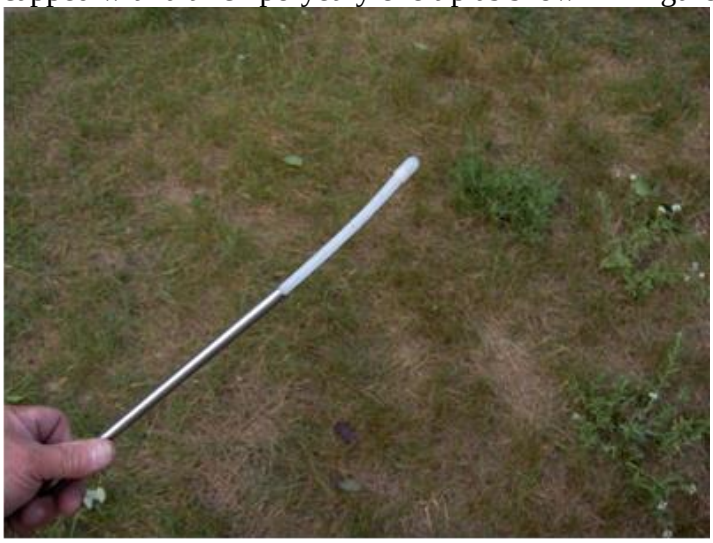
Figure 2: SedPoint w/ polyethylene tip partially loaded into installation tool.

The original SedPoints were designed as dedicated one time use, long-term monitoring points. Most of the points I installed a decade ago are still operational (if kept from sunlight). I used many of these for short term investigations as well, and upon retrieval I found that the polyethylene tip did not often survive the installation undamaged, and thus the microwell could not often be reused.

The SedPoint2 was developed to allow for a wider application of this technology. See Figure 3. The main advancement was over the original SedPoint was the addition of a cone shaped stainless steel tip. This tip provides significant internal structural support which seems to prevent much or all of the damage incurred by the original SedPoints during installations. A happy consequence of this is that most of the SedPoint2 microwells can be retrieved, cleaned and reused if desired. They are still applicable to long-term monitoring systems. I have found that a SedPoint2 with a 2" screen works nearly as well as a PushPoint Sampler for investigations in many cases, with the additional benefit of the option to leave the point in the sediment for future confermational sampling or even long term monitoring.

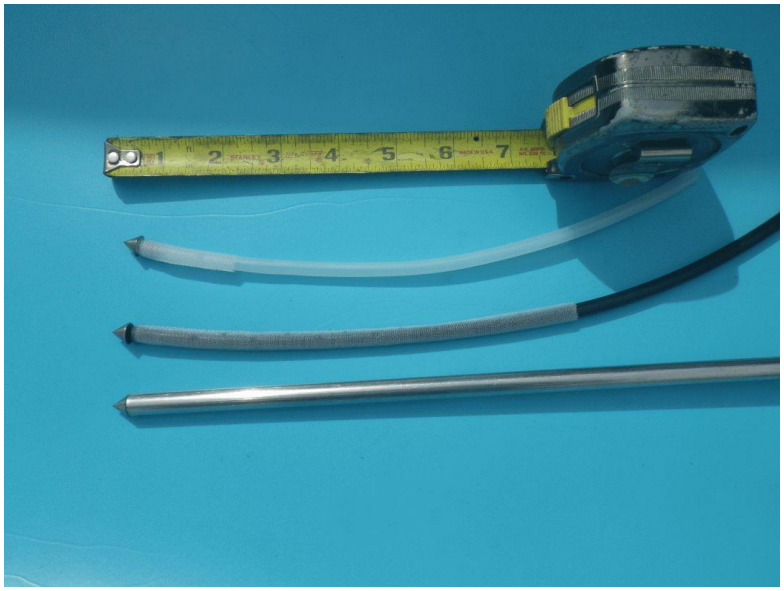

Figure 3: (top to bottom) SedPoint2 with 2" screen made with white/natural polyethylene; 7.5" SedPoint2 made with black polyethylene (stealth installations); SedPoint2 fully loaded in installation tool. SS SedPoint tip and Installation Tool are 3/8" diameter.

We have been developing a few installation tools for the SedPoint2. The most basic one is a 6' long piece of 3/8"OD stainless steel tubing with a T handle at its top (standard SedPoint Installation Tool). The SedPoint2 fits inside this tube so that the shoulder of the stainless cone-shaped tip rests against the tip of the Installation Tool. One pushes the SS Installation Tool to the desired depth in the sediments and then the SS tube is removed from the sediments while the SedPoint is maintained at the desired depth. The installation process usually takes only a few seconds.

The most versatile Installation Tool is the 6' tool made mostly of 1/8"NPT stainless steel pipe (~7/16" outside diameter). This tool is much stronger than the standard Installation tool as the upper 5' of the Tool is SS pipe which is attached to a one foot section of SS tubing, thus making this tool much more rigid than the standard Installation Tool. In addition, this tool has been fitted with a 1/8"NPT coupler at the top which allows the addition of SS pipe extensions. This tool is well suited to performing investigations in water up to 20+ feet deep by installing SedPoints and sampling them from a boat, or having the SedPoint long enough to reach the shore where they can be sampled in the short term and the long term at leisure.

Installation

To install SedPoints into sediments for porewater or soil gas sampling, load the top of the SedPoint into the 6' SedPoint Installation Tool from the bottom of the tool, being careful to tuck the top edges of the polypropylene screen into the Tool before sliding the screen fully into the tool. The SS protective tip (or polyethylene in the original SedPoint) should fit snugly against the stainless steel Installation Tool tip and the excess ¼" polyethylene tubing should slide up through the Installation Tool handle. The SedPoint loaded in the Installation Tool can frequently be pushed into the sediments to the desired depth by hand without pre-probing a hole. If this doesn't work you should use a PushPoint or a slide-hammer "punch-bar" type pre-probe to open a 3/8" hole into the sediments. The 1/8"NPT Installation Tool can also be fitted with slide-hammer to help aid installations into more dense sediments. Do not overdrive this Installation Tool with the slide-hammer.

To install the SedPoint, first push the loaded Insertion Tool into the sediments to the desired depth. Then grasp the Tool handle in one hand and the excess polyethylene in the other hand, and gently push the poly tubing through the Tool handle at the same rate that you use the handle to pull the Tool from the sediments. This keeps the SedPoint at the same depth in the sediments while the Tool is removed and helps extrude the SedPoint screen from the Tool. Generally, once the screened portion of the SedPoint has been pushed from the Installation Tool, resistance decreases significantly and the Tool can be easily removed from the sediments while the remainder of the SedPoint tubing slides through Tool. What usually happens in saturated sediments is that fine silt and sand from the formation will quickly collapse around the SedPoint forming a good seal that will not allow surface water to be drawn down the annular space surrounding the SedPoint. Leave as much of the ¼" poly tubing above the sediments as you wish and cap with a vinyl cap to prevent surface water exchange when left in place for extended periods. Remember that sunlight will adversely affect the lifespan of the clear/neutral polyethylene tubing; not so much the black polyethylene tubing. I would recommend keeping the stub of tubing sticking out of the sediments short, and underwater if possible.

If the SedPoint is to be used for soil gas investigation/monitoring, use a pre-probe to create ~ 3/8" diameter hole into the soil to the desired depth – 5 to 6 feet is a good depth for many applications. If the hole stays open, a SedPoint can be slid to the bottom of the hole. If the hole does not stay fully open, the Installation Tool should be used to set the

SedPoint to the desired depth in the hole. Once the SedPoint is in place, pour dry fine sand into the hole (I usually use a 2-liter soda bottle full of sand for this purpose) to about 1 foot or so below the surface. Then pour a 4" plug of powdered bentonite (from another soda bottle) into the bore hole to seal the hole. Fill the hole the rest of the way to just below land surface with fine sand. Pour some water on to the boring to hydrate the bentonite. Natural soil moisture will eventually hydrate the bentonite powder.

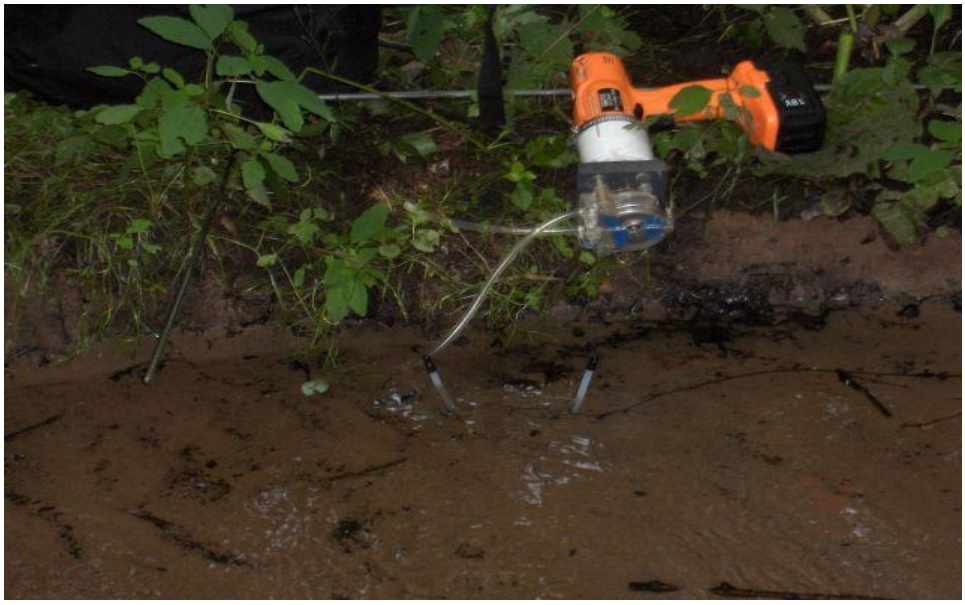

Figure 4: Two SedPoints installed at 5.5' and 3' below the sediment surface. A portable DrillPump (MHEproducts.com) is used for sampling.

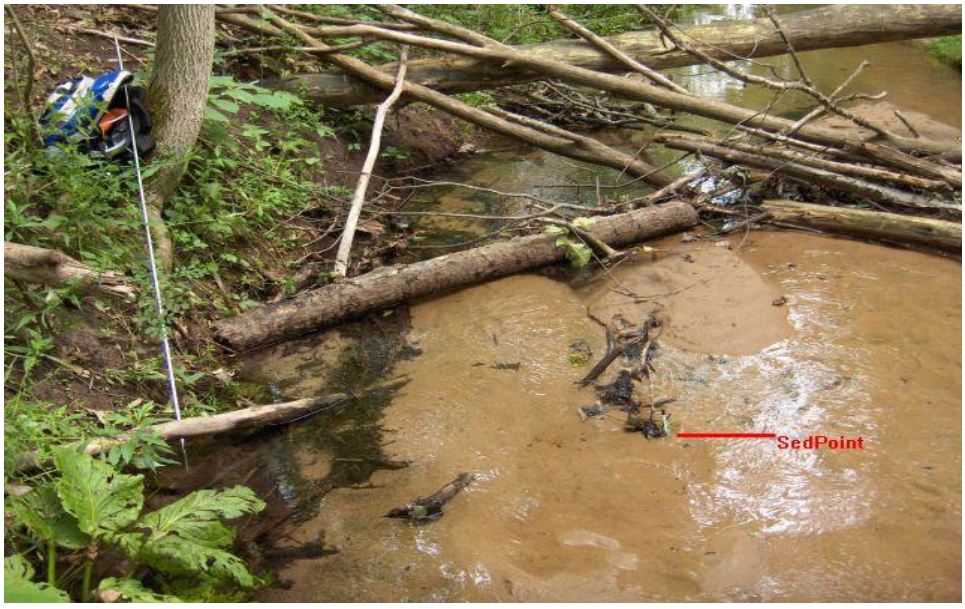

Figure 5: SedPoint installed 6' below sediments.

Notes

1) Porewater will seek its own elevation in the SedPoint tubing as it would in a PushPoint Sampler. The water level relative to the surface water can be seen directly through the translucent white/neutral tube, or clear vinyl tubing can be attached to the SedPoint tubing and the SW/GW differential water level can be measured as one would do using a PushPoint. If the SedPoint is constructed of black tubing you'll have to attach clear tubing to make the measurement. The general method is described in some detail in the PushPoint Instructions and Applications manual available at: http://www.mheproducts.com/MHE-instructions-ver-2.01.doc .
2) The screen of the SedPoint should not be bent. Bending the screen may cause it to split along its seam. If that happens, the screen generally cannot be fixed.
3) SedPoints can be up to ~150-200' long at which point friction takes over and it's very difficult to pump a good flow. It is sometimes desirable to install a SedPoint out in a water body and then run the tubing along the sediments to shore. Sometimes it's possible to bury this line to the shore in a shallow trench or place it within ½" electrical conduit (EMT) laid on the sediments. This line (or multiple lines) can be brought into a flush-mounted well enclosure on shore where it is easy to sample the various locations over time. I usually bring 3-7 lines to a single enclosure.