

The Auger – An Alternative to Soil Pits

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The Auger: Assembly and Operation

Say goodbye to Soil Pits; say hello to the The Auger: What previously took 3-5 hours, can now be accomplished in 20-30 minutes. Samples can be taken to depths of at least 90cm; the only limiting factor is the length of the custom bar. By keeping accurate depth measurements, bulk density can be measured.

The first step is to purchase an auger similar to the one below. The auger should be a two person model, at times it will be necessary to core through solid rock.



This is a Briggs and Stratton 6.5 hp Powerhead and can currently be purchased for \$399 from Northern Tool.



This photo shows both the custom made bar and the concrete bit. The bar can be purchased from a local machinist to fit your specifications. The concrete diamond bits are Ditec Supreme Pro core bits and cost between \$250-300. Each bit is good for 30-40 samples; depending on the type of material that is being cored.

The Bar can be attached to the auger using a pin, similar to the one to the right.





To the left is a close up of the bit, the indentations occur from striking the bit with a 3lb sledge to loosen the soil.

Operation



After the bar is fitted to the Auger and the Auger is fueled you can begin to operate. Generally, we take samples in 15cm increments: Mark the bit with a sharpie, at 15cm intervals before each sample. The measurements on the bar can be made using black electrical tape.

Often the ground is loose at the surface; it helps to add some water at the top to prevent the hole from caving in. If the soil is very dry it helps to add water while coring. However, when you add water it is difficult to accurately estimate available nitrate and ammonium under field conditions.

Proceed to auger to your first measuring point. It may be possible to core to 15cm or clay may clog the teeth and necessitate unloading the bit earlier than 15cm. To empty the bit; remove the auger from the hole, hold it over a bucket and have a third person bang on the bit with a 3lb metal sledge until all of the contents of the bit fall into the bucket. The metal sledge sends vibrations through the bit, loosening the material. The banging slightly damages the bit, but not significantly and the bit will need to be replaced before the sledge makes any major changes to the bit. The process requires three people to be effective; two for drilling one for emptying the bucket and labeling the bags.



Three Pound Sledge

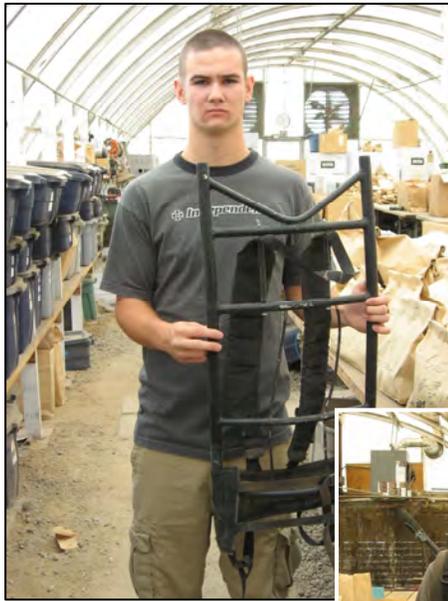
Sample Bag

Collecting Bucket

When the auger is removed the third person can check the depth of the hole using a metal ruler and record the measurement on the sample bag. After returning the auger to the hole to drill to next measuring point; the third person carefully empties the bucket into a sample bag, labels the bag with the site name and the depth.

Transporting the Auger

Often sites are located on rough or steep terrain and can be separated by several kilometers. In the event that the sites are spread apart, it is helpful to strap the Auger to a backpack frame and hike it to the next site. Two people can carry the soil samples and gear while the third person can transport the auger. The auger can be attached to the frame using two straps. The pictures below demonstrate how the auger may be transported.



Operations Checklist

- Fill Auger with gas / check spark plug
- Attach bar and bit
- Mark measurement increment with sharpie and ruler
- Take core samples adding water when necessary
- Label sample bags and move onto next site

Field Checklist

- Auger, bar and bit
- Sample bags, sharpies, GPS with points, data sheets
- 4-5 quarts of water depending on how many sites
- Backpack to carry out samples
- Backpack frame with straps to carry Auger
- Bucket, one-meter metal ruler, 3lb sledge

Stuff to Keep in the Car

- Extra bits
- Monkey wrench to remove bits
- Extra water
- Plastic totes for transporting the samples

Questions:

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