

Soil Sampling Drill Systems

Advantages & Disadvantages



Environmental Drilling Methods

- ▶ Solid Stem Auger
- ▶ Hollow Stem Auger/Split Spoon
- ▶ Direct Push
- ▶ ODEX
- ▶ Coring
- ▶ Sonic

Solid Stem Auger Advantages

- ▶ Relatively Efficient
- ▶ Minimal Support Required
- ▶ Advancement into Weathered Bedrock





Solid Stem Auger Disadvantages

- ▶ Sample Quality
- ▶ Depth Accuracy
- ▶ Well Installation Quality
- ▶ Zone Cross Contamination
- ▶ Sloughing
- ▶ Sample Spin-Up
- ▶ Sample Cross Contamination

Hollow Stem Auger Advantages

- ▶ Ability to Split Spoon Sample
- ▶ Continually Cased Borehole
- ▶ Select Sample Depths



Hollow Stem Auger Disadvantages



- ▶ Time Intensive
- ▶ Excessive Soil Cuttings
- ▶ Excessive Material Required For Backfill & Well Installation
- ▶ Labour Intensive
- ▶ Difficulty Drilling in Flowing Sands

Direct Push Advantages

- ▶ Speed of Drilling/Well Installation
- ▶ Sample Quality
- ▶ Depth Accuracy
- ▶ Continuously Cased Borehole
- ▶ Sample Doubles as Shelby Tube
- ▶ Minimal Soil Cuttings
- ▶ Clean
- ▶ Ability to Drill Telescopically





Direct Push Disadvantages

- ▶ Loud
- ▶ Bedrock Refusal
- ▶ Difficult Drilling in Flowing Sands

Sonic Drilling Advantages

- ▶ Powerful
- ▶ Sample Quality
- ▶ Depth Accuracy
- ▶ Continuously Cased Borehole
- ▶ Ability to Drill Telescopically
- ▶ Can Switch to Wireline System for Increased Efficiency
- ▶ Ease of Drilling in Flowing Sands
- ▶ Able to Drill Into Bedrock



Sonic Drilling Disadvantages

- ▶ Additional Support Equipment Required
- ▶ Water Required For Casing Advancement



ODEX Advantages

- ▶ Continuously Cased Borehole
- ▶ Ability to Drill Hard Bedrock
- ▶ Can Drill Telescopically
- ▶ Sample Collection Using Diverter & Cyclone
- ▶ Great in Large Cobble
- ▶ Great For Cased Well Installations
- ▶ Depth Accuracy



ODEX Disadvantages

- ▶ Sample Quality
- ▶ Some Additional Support Equipment Required
- ▶ Dust & Water Containment Required on Most Downstream Sites



Coring Advantages

- ▶ Sample Quality
- ▶ Depth Accuracy
- ▶ Ability to Drill Very Hard Rock
- ▶ Wireline Sample Retrieval



Coring Disadvantages

- ▶ Water Required
- ▶ Additional Support Equipment
- ▶ Fluid Containment
- ▶ Fluid Disposal
- ▶ Core Recovery Can Vary Depending on The Formation
- ▶ Speed of Drilling



Conclusion

- ▶ There are many different drilling methods for many different sampling requirements. Finding the right match is key.
- ▶ Less expensive drilling equipment doesn't always equal cost savings.
- ▶ Knowing ground conditions ahead of time (when possible) will help drilling contractors come up with a better game plan.