

Energy and Environmental Design Project

Permeameter Redux

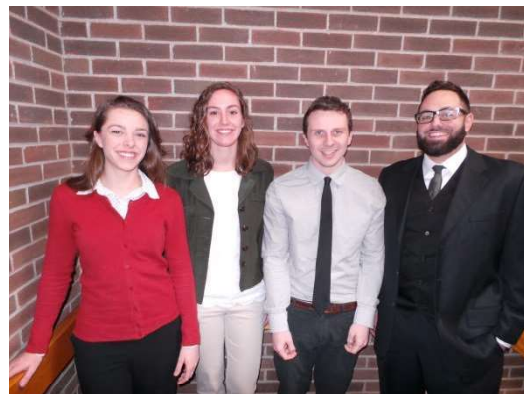
Mission Statement

The goal of this project is to design, manufacture, and test a modular permeameter prototype that can be used for a wide variety of purposes, including contaminant tracer tests, in addition to measuring hydraulic conductivity, which will ultimately offer the U.S. Geological Survey a device with a higher functionality at a lower cost.

Synopsis

Conventional permeameters are devices that measure hydraulic conductivity of a given soil sample but are limited in their usefulness to the US Geological Survey (USGS) because of their inability to perform other flow through tests. The Permeameter Redux Team has designed, manufactured, and tested a modular permeameter prototype that can be used for a wider variety of purposes, including contaminant tracer tests, which will ultimately offer the USGS a less expensive but more functional device.

The United States Geological Survey (USGS) originally sought out to design and build an inexpensive, meter-scale permeameter after discovering the shortcomings associated with the smaller, more expensive ASTM (American Standard for Testing and Materials) standard permeameter in spring of 2014. The latter could only be used in determining soil hydraulic conductivity, but not in quantifying the ways in which contaminants move through a sediment column. By developing a larger scale permeameter, the team will be able to perform tracer tests in order to achieve this goal. A prototype was constructed by hand using wood and acrylic during the summer of 2014 but failed in testing because it proved not to be watertight. The team's objective is to come up with an improved design and utilize 3D design and printing to manufacture and test a functional, inexpensive, meter-scale permeameter.



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