

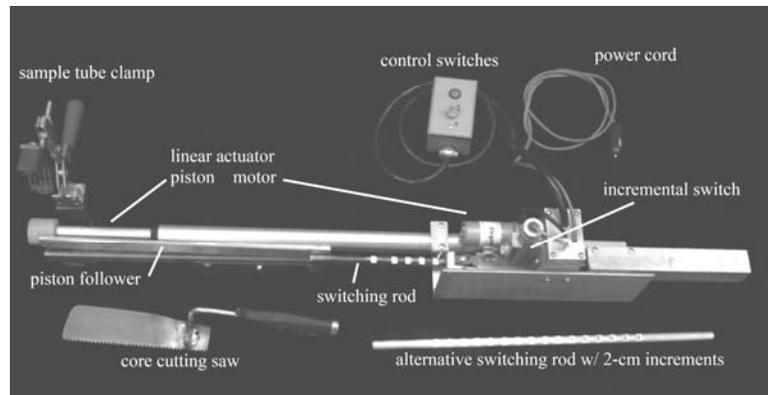
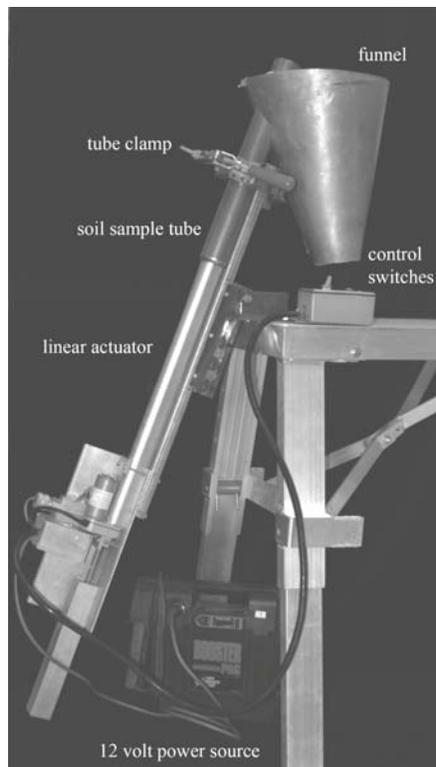
An Improved Method for Soil Sampling at Small Increments

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Measurement of soil bulk density and volumetric water content in small depth increments is a tedious and time-consuming task, but very important in many research applications. We designed an electric sampler to improve accuracy and decrease labor requirements. The new method works even in loose, dry soils, and can be used to provide increments at less than 0.5 inch if desired. The sampler uses an electric linear actuator to push an intact soil core out of the sampling tube. The soil core is maintained in a vertical position and protected from fracturing by remaining inside the tube until sectioned with a saw blade. Precise length increments and flat cuts are easily obtained. Compared to existing incremental sampling technology developed 30 years ago for loose, dry soil conditions, the electric sampler had a two-fold reduction in sample variability. The electric sampler requires only 7 minutes to collect a 10-inch core and section it into 13 increments compared to 20 minutes per core with the older sampler.



At left: Electric incremental sampler mounted on a bench for use in the field. The soil core in the sampling tube is pushed out the top of the tube by the linear actuator. Stopping points are controlled by a switch at pre-determined intervals, and the operator cuts the soil core flush with the top of the sample tube.

Above: Details of the electric sampler with the sample tube removed. The switching rod can be exchanged when different depth increments are desired. Also shown is the saw blade used to cut dry, consolidated soil flush with the end of the sample tube without uncontrolled fracture of the core.