A PROBE FOR ESTABLISHING THE POSITION OF THE WATER SURFACE IN STANDPIPES

In drainage investigations the need for following the position of the water table surface frequently arises. To accomplish this, standpipes of some sort are installed and the position of the phreatic surface in these pipes is measured periodically. If the water surface is some distance below the upper end of the pipe and if the diameter of the pipe is small, it is frequently difficult to measure accurately the position of the water surface. The device herein described enables an operator to determine with accuracy the water-table elevation in standpipes having a diameter of 1 inch or less.

The measuring device consists of a graduated copper probe rod, a 45-volt battery, a 500-ohm resistor, and a small milliammeter. The construction and operation of the device can best be described with the aid of Fig. 1. The probe consists of a 5-foot length of \( \frac{1}{4} \)-inch copper tubing on which a scale graduated in 0.1-foot units is painted. One strand of a rubber-covered zip cord inside this tube is soldered to a small brass machine screw firmly embedded in a rubber insulator which in turn is incased in a 1-inch length of \( \frac{1}{8} \)-inch copper tubing soldered to the lower end of the probe. The second strand of the zip cord is soldered to the upper end of the copper probe. The 5-foot zip cord is connected serially through a 500-ohm resistor, a 45-volt "B" battery, and a small milliammeter. The resistor is provided to protect the milliammeter in the event of a short-circuit. The battery, resistor, and milliammeter can be mounted in a small box having inside dimensions of about 5 × 5 × 3.5 inches which can be placed on the ground near the standpipe while the probe is inserted in the pipe. When the lower end of the probe contacts the water surface, current flows through the circuit causing the needle of the milliammeter to deflect. The position of the water surface is then recorded in terms of the position of the probe scale and the top edge of the standpipe, which is the usual datum.

Two of these probes were used during the past year during which time over 3,000 measurements were made. No difficulty was experienced in reading the position of the water table to the nearest 0.05-foot in less than 15 seconds.—M. B. Russell, Department of Agronomy, Iowa State College, and Division of Research, Soil Conservation Service, Ames, Iowa.