

The pressure of the air in the space beneath the sample can be diminished by means of a water jet pump. Then the apparatus is turned upside down. When the pressure of the air in the apparatus is low enough, air will percolate through the sample. The air pressure is measured by a mercury gauge.

COMPRESSED AIR CAPILLARITY DEVICES

C. A. Hogentogler: The apparatus shown in Figure 54 illustrates a method to determine the capillary attraction of fine grained soil consolidated at different pressures. It utilizes a modification of the basic principle described by Jamin and others, in 1896. The sample may be saturated, loaded by a spring, and have compressed air applied to the upper surface. Actually consolidation devices of the type shown in Figure 2 are used for this purpose by the Bureau of Public Roads. The sample is consolidated at the desired pressure by lever loading. One of the tubes which provides for application of water to the bottom of the sample is then capped, the other is attached to the compressed air reservoir. The loading lever is clamped to prevent rise of the sample when the compressed air is applied. Pressure is allowed to build up gradually until the gage indicates rapidly falling pressure. The maximum reading recorded from the gage is the force required to overcome the capillary pressure of the soil.

Dr. L. Bendel: The capillarity is determined by means of a capillarimeter, specially designed for the purpose, in which the sample of soil is subjected to pressure. When the soil is brought in contact with water, counterpressure is applied by means of air, in order to prevent the water from rising. This apparatus offers the advantage that the corresponding capillarity can be determined for each consistency of the materials and also for each type of bed. This device was invented by Engineer Maag.

'INDICATOR CAPILLARITY DEVICES'

D. H. F. Winterkorn: A good indication of undesirable capillary properties is given by the results of the slaking test of the Russian pedologists. In the test as used by our laboratory the specimen is formed by manual compression of the moist soil in the mold used for preparing cement mortar test specimens. Then the specimen is permitted to dry to constant weight, first in air then over concentrated sulphuric acid and coated on both ends with paraffin to leave a bare center $\frac{1}{4}$ in. wide. Hereafter, it is suspended in water, which covers the specimen completely, and the time is recorded in which the bottom half of the specimen separates from the rest. Also, the change in appearance of the specimen during the time of immersion is noted.

R. E. Bollen: Three oven dried briquettes of soil are placed in a flat-bottom pan containing water one-half inch in depth so that each briquette is not closer than 2 in. to the sides of the pan or to another briquette. The time required for the water to rise and wet the top of the briquette is recorded as the capillarity time. The time required for the briquette to fall apart or slake down is recorded as the absorption failure. If the briquette falls apart or slakes down before its entire top is wet with capillary water, the capillarity time is recorded as being longer than the absorption failure time.

PERMEABILITY TESTS

Permeability tests are used to determine the quantity of water under pressure that will flow through soils in various conditions.

The permeameters reported by various laboratories are listed in Table 6 and are arbitrarily divided into three types, depending upon the method of applying the head of percolating water. These are:

C. Constant head, Figure 60.