A COMPARISON OF THE HYDROMETER METHOD AND THE PIPETTE METHOD FOR MAKING MECHANICAL ANALYSIS OF SOILS, WITH NEW DIRECTIONS

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A comparison has been made between the hydrometer method and the pipette method and it has been found that what the pipette method determines as clay (0.005–0.00 mm) and the finer clay (0.002–0.000 mm), the hydrometer method will determine in 1 and 2 hours, respectively, even though theoretically it should take a much longer time. This comparison has been checked by the United States Bureau of Chemistry and Soils, and the results obtained go to show that the two methods agree very closely with few exceptions. It would seem, therefore, that the hydrometer method can be used with confidence for making mechanical analysis of soils for all practical purposes.

The final procedure as developed up to date for making mechanical analysis of soils by the hydrometer method, is as follows: Add 50 grams of the fine textured soils and 100 grams of the sand, based on oven-dry condition, to the dispersing cup. Fill the cup with distilled water to about 1½ inches from the top. Add to the contents 5 cc of a solution of saturated and filtered sodium oxalate and 5 cc normal sodium hydroxide. If the soil is in lumps, sufficient time must be given to it to slake and to soak. As a matter of fact, it is well to allow all soils to soak for about 15 minutes before dispersing them. The soils should always be air dry, because in the wet condition they do not slake. The soaking can be done in a separate vessel and the material then washed into the cup. Then connect the cup to the stirring motor, and stir the contents for 5 minutes in the case of sands, and 10 minutes in the case of all other soils. Those soils, however, which are recognized as difficult of dispersion should be dispersed for 20 to 30 minutes, or longer: The sands should not be stirred more than 5 minutes because they seem to undergo grinding.

Pour and wash the contents into the special cylinder. If 50 grams of soil are used, fill the cylinder up to the lower mark with the hydrometer in it. If 100 grams of soil are used, fill it to the upper mark with the hydrometer in it. Only distilled water should be used. Then take the hydrometer out, place the palm of one hand on the mouth of the cylinder and shake the contents vigorously, turning the cylinder upside down and back several times. Place the cylinder...