

Soil Mechanics laboratory

Report #1

CE 3143 - 001

Submitted by

Name here

Date here

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Water Content Determination

Objective:

To determine the natural water content of a give soil sample.

Applications of the test:

One of the applications of water content test is that it will allow us to find dry unit weight. Water content is also used in deriving phase relations.

Apparatus used:

2 containers (can#3 and can#5), electric oven, balance, desiccator

Test procedures:

1. Measure the weight of can # 3 and record it as $W_1(g)$
2. Add the soil in the can, measure its weight, and record it as $W_2(g)$
3. Place it in the electric oven at the temperature of $110^{\circ}C$ for 24 hours
4. Bring the can out of oven, and put it in desiccators for few minutes to cool down
5. Measure its weight, and record it as $W_3(g)$
6. Use the same steps for sample number 2

Analysis of test results:

S. No.	Sample No.	1	2
1	Can No:	#3	#5
2	Weight of can, $W_1(g)$	28.40	33.40
3	Weight of can + wet soil $W_2(g)$	83.40	85.00
4	Weight of can + dry soil $W_3(g)$	73.80	76.00
5	Water/moisture content $W(\%)=[(W_2 - W_3)/(W_3 - W_1)]\times 100$	21.15%	21.13%

Sample Calculations:

Can #3:

$$W(\%) = [(W_2 - W_3) / (W_3 - W_1)] \times 100$$

$$W(\%) = [(83.40 - 73.80) / (73.80 - 28.40)] \times 100$$

$$W(\%) = 21.15\%$$

Can #5:

$$W(\%) = [(W_2 - W_3) / (W_3 - W_1)] \times 100$$

$$W(\%) = [(85.00 - 76.00) / (76.00 - 33.40)] \times 100$$

$$W(\%) = 21.13\%$$

$$\text{Average} = (21.15 + 21.13) / 2 = 21.14\%$$

The natural moisture content of the soil sample is = **21.14%**

The data collected in class: {17.4, 21.13, 22.33, 21.49, 21.49, 21.15, and 21.13}

$$\text{Mean, } \mu = (\sum X_i) / n = (17.4 + 21.13 + 22.33 + 21.49 + 21.49 + 21.15 + 21.13) / 7 = \mathbf{20.87\%}$$

$$\text{Standard deviation, } \sigma = \sqrt{(\sum (X_i - \mu) / n - 1)} = \mathbf{1.589}$$

$$\text{Coefficient of Variation, COV} = \sigma / \mu = \mathbf{0.076 = 7.6 \%}$$

Summary and conclusion:

The average water content of the given soil sample is **21.14%**. The class average is found to be **20.87%** with a standard deviation of **1.6** and a COV of **7.6%**.

Comments/Remarks/Observations:

Your comments and observations here...