SNS COLLEGE OF TECHNOLOGY

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COIMBATORE

DEPARTMENT OF CIVIL ENGINEERING

19CEB201 – CONSTRUCTION MATERIALS

II YEAR / III SEMESTER

Unit 1 : Stones – Bricks – Building Blocks

Topic 4 : Tests on Stones

Hardness Test

For determining the hardness of a stone, the test is carried out as follows:

- ✓ A cylinder of diameter 25mm and height 25mm is taken out from the sample of stone.

- ✓ It is weighed.

- ✓ The sample is placed in Dorry's testing machine and it is subjected to a pressure of 1250 gm.

- ✓ Annular steel disc machine is then rotated at a speed of 28 rpm.

- ✓ During the rotation of the disc, coarse sand of standard specification is sprinkled on the top of disc.

- ✓ After 1000 revolutions, specimen is taken out and weighed.

- ✓ The coefficient of hardness is found out from the following equation:

Coefficient of hardness = 20 - (Loss of weight in gm/3)

Hardness Test

Impact Test

The resistance of stones to impact is found by conducting tests in impacting the testing machine.

- ✓ A cylinder of diameter 25mm and height 25mm is taken out from the sample of stone.

- ✓ It is placed on the machine. And taken a 2kg stone sample at 24 hours put in the oven.

- ✓ Fill the cylinder cup in three-layer.

- ✓ Each layer 25 times compacted.

- ✓ Take the weight of the cylinder.

- ✓ Falling the hammer 15-time blow allowed to fall axially in a vertical direction over a specimen in an impact testing machine.

- ✓ The Hight of the first blow is 1cm, that of the second below 2cm, that of the third below 3cm.

Impact Test

✓ Blow at which specimen breaks is noted. If it is nth blow, 'n' represents the toughness index of stone.

Impact value = w2*100/W1

- Where, W1 =passing stone in a sieve before falling hammer

- w2 = after falling hammer wt. of stone

The recommended impact values for various works are:

(a) for wearing course ≯ 30%

(b) for bituminous macadam ≯ 35%

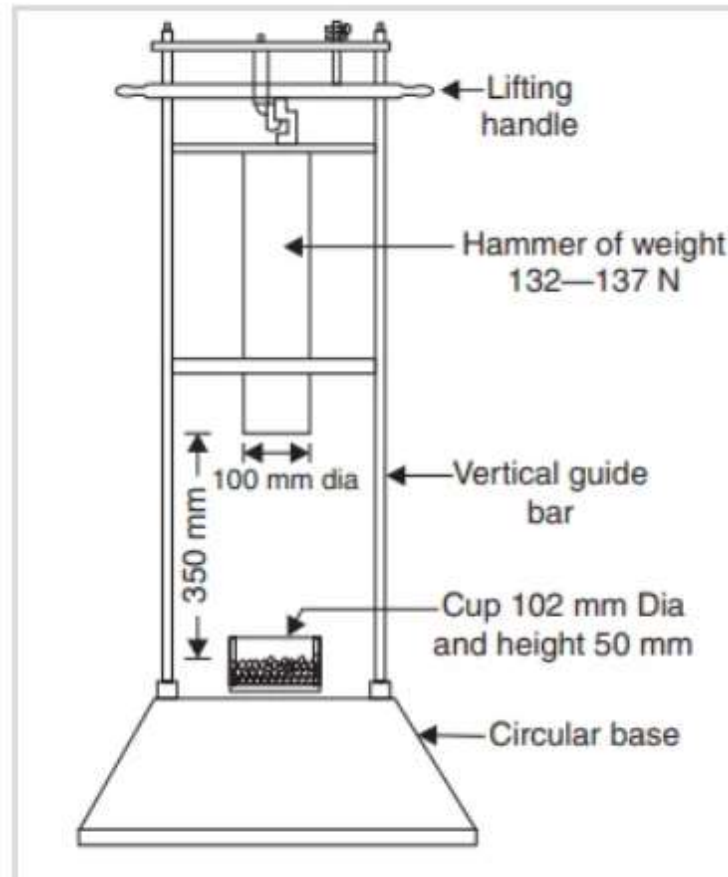**(c) for water-bound macadam ≯ 40%**

Impact Test

Impact Test

Microscopic Test

➤ The sample of the test is subjected to microscopic examination.

➤ The sections of stones are taken and placed under the microscope to study the various properties such as

- o Average grain size

- o Existence of pores, fissures, veins and shakes

- o Mineral constituents

- o Nature of cementing material

- o Presence of any harmful substance

- o Texture of stones etc.

Smith's Test

➢ This test is performed to find out the presence of soluble matter in a sample of stone.

➢ Few chips or pieces of stone are taken and they are placed in a glass tube.

➢ The tube is then filled with clear water.

➢ After about an hour, the tube is vigorously stirred or shaken.

➢ Presence of earthy matter will convert the clear water into dirty water.

➢ If water remains clear, stone will be durable and free from any soluble matter.

Water Absorption Test

➢ With this test **cube specimen weighing about 50 grams** are Ready, and the test is carried out at the steps given below:

➢ Note the weight of dry specimens as **W1.**

➢ Place the specimen in water for **24 hours**.

➢ Take out the specimen, wipe out the surface with a piece of cloth, and weigh the specimen. Let its weight be **W2.**

➢ Suspend the specimen freely in weight and water it. Let its weight be **W3.**

➢ Place the specimen in boiling water for **5 hours**.

➢ Then take it out, wipe the surface with a cloth, and weigh it. Let this weight be **W4**. Then,

Water Absorption Test

- Percentage absorption by weight = $(W2 - W1) / W1 \times 100$ ....(1)

- Percentage absorption by volume = $(W2 - W1) / (W2 - W3) \times 100$ ....(2)

- Percentage porosity by volume = $(W4 - W1) / (W2 - W3) \times 100$ ....(3)

- Density = $W1 / (W2 - W1) \times 100$ ....(4)

- Specific Gravity = $W1 / (W2 - W3) \times 100$ ....(5)

- Saturation Coefficient = Water Absorption / Total Porosity = $(W2 - W1) / (W4 - W1)$

Thank You!!

Tests on Stones/ 19CEB201 -CE/ /Nithyapriya K. / AP / CIVIL/ SNSCT