STABILIZATION OF MUD BLOCKS

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College ***:*** *B.L.D.E.A's V.P Dr P.G.Halakatti College of Engineering and Technology, Vijayapura*
Branch ***:*** *Department of Civil Engineering*
Guide(s) ***:*** *Mr. M.B.Ishwargol*
Student(s) ***:*** *Ms. Sakshi Bpatil*
Ms. Samyukta Patil
Ms. Sanjana
Ms. Savita Dodamani

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Introduction:

Increase in population and high demand for dwelling houses the price of such houses has increased and is increasing tremendously in recent years. This is compounded by the fact that the available land for this development is becoming scarce, especially in the urban and suburban areas. Many people, especially the lower- and middle-income groups can no longer afford to buy them. One of the factors which contribute to the problem is the high cost of building materials which at the present time use the conventional materials and method of construction. One of the ways to alleviate the problem is to use cheap building materials available locally. This can be done either by using recycled or sustainable raw materials for houses which are comparable to the conventional materials made from cement, sand, and aggregates to give an acceptable level of quality and comfort. This project reported an attempt on the possibility of using building blocks made from earth stabilised with cement, rice husk ash known as compressed stabilized earth block or CSEB.

Objectives:

1) To find the optimum mix proportions of stabilized mud blocks.
2) To determine the compressive strength of stabilized mud blocks by using cement, rice husk ash and coir fibre.
3) To determine the water absorption of stabilized mud block.
4) To compare the ratio of strength by cost of stabilized mud block with red bricks.

Methodology:

1. Collected soil is sieved through 5 to 6mm mesh sieve.
2. To obtain a uniform mix of minerals components, water and stabilizers, lumps more than 200mm in diameter after excavation must be broken up.

3. The tests are performed to establish the right proportion of soil, stabilizer, and water to produce good quality blocks.
4. Dry materials are mixed first until they are in a uniform color, then water is added and mixed until a homogenous mix is obtained.
5. The mixture is added to the mould of size 230X190X100 mm.
6. Various tests are performed on the stabilized mud blocks for strength.
7. Using the test results suitable graphs are plotted.

Results and Conclusion:

Compressive Strength Test: Blocks were tested in universal compression machine after the curing of 7 days and 28 days. The results of the test are as follows:

Table 1: Results of compressive strength of stabilized mud blocks

Sl. No.	Mix Proportion	Compressive Strength Test For 7 Days (In N/Mm^2)	Compressive Strength Test For 28 Days (In N/Mm^2)
1	100%Soil	1.41	2.8
2	94%Soil+6%Cement	1.62	3.45
3	92%Soil+8%Cement	2.33	4.15
4	90%Soil+10%Cement	3.15	4.99
5	88%Soil+10%Cement+2%RHA	3.3	5.12
6	86%Soil+10%Cement+4%RHA	3.432	5.262
7	84%Soil+10%Cement+6%RHA	3.323.52	5.35
8	83.5%Soil+10%Cement+6%RHA+0.5%CF	3.735	5.585
9	82%Soil+10%Cement+6%RHA+ 1% CF	2.62	4.475
10	82.5%Soil+10%Cement+6%RHA+1.5%CF	2.47	4.27

Water Absorption Test:

Table 2: Results of water absorption of stabilized mud blocks

Sl. No.	Mix Proportion	Water Absorption (In %)
1	100%Soil	23.61
2	94%Soil+6%Cement	12
3	92%Soil+8%Cement	11.5
4	90%Soil+10%Cement	11.3
5	88%Soil+10%Cement+2%RHA	12
6	86%Soil+10%Cement+4%RHA	12.3
7	84%Soil+10%Cement+6%RHA	12.31
8	83.5%Soil+10%Cement+6%RHA+0.5%CF	12.8
9	82%Soil+10%Cement+6%RHA+ 1% CF	13.4
10	82.5%Soil+10%Cement+6%RHA+1.5%CF	14

Cost Analysis of Stabilized Mud Block and Red Brick:

Table 3: Cost analysis of stabilized mud block and red brick

Sl. No.	Particulars	Stabilized Mud Blocks	Red Brick
1	Compressive strength (in mm^2)	5.585	3.5
2	Total cost of 1 block in Rs.	7/-	6/-
3	Ratio of strength by cost	0.79	0.58

Scope for Future Works:

1. Different stabilizers such as Areca Nut Fibre, Coconut Shell Powder, Fly Ash, etc can be used.
2. Proportions of stabilizers can be varied to prepare the mud blocks.
3. Split tensile strength test can also be performed.