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Studies on water proof mud Plaster

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STUDIES ON WATERPROOF MUD PLASTER

MUD PLASTER CAN BE MADE NON-ERODABLE by using 5 per cent cut-back or by treating the surface with a slurry of cement-lime-sand (4:1:4 by weight) in 1 per cent soap solution. The success of a mud plaster depends upon the nature of the soil, and the atmospheric temperature at the time of application of the plaster and during its curing. The data collected on the above two points are described in this note.

Effect of the nature of soil on mud plaster — To soils from different parts of India 5 per cent cut-back* was added and 2 in. cubes made from the mixture. After drying in the sun for 7 days the moisture absorption by these cubes after complete immersion in water for 24 hr. was determined (Table 1).

Next, soil samples having higher plasticity index (P.I.) were mixed with sand to bring down their P.I. to about 10, as soils with P.I. 10 are fairly water resistant. Mud

*Cut-back was prepared by using bitumen 80/100 pen. with 20 per cent kerosene oil and 1 per cent paraffin wax.

plasters were then prepared using these soils in the usual way by the addition of 5 per cent cut-back. The plasticities of these soils and their moisture absorption capacities were determined (Table 2). The importance of using a well-designed soil in making mud plaster is evident from the values given in Table 2. Soils with a clay content of more than 25 per cent cracked during the drying of the cubes; but when properly designed no cracking occurred. The differences in the moisture absorption exhibited by the different soils brought to the same plasticity index (c. 10) are mainly due to the differences in their clay contents.

Effect of curing temperature on the mud plaster — Mud plaster was prepared by mixing a local soil (P.I. 10; sand 42.5 per cent) and *bhusa* (4 lb./cu. ft. of soil) with water to a workable consistency. The mixture was kneaded occasionally and allowed to rot for about a week. Cut-back was added to the mud plaster at the rate of 5 per cent per cu. ft. of dry soil by weight. After thoroughly mixing the cut-back 2 in. cubes were made of the treated mud plaster, dried in the sun for 7 days and then in an electric oven maintained at different

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TABLE 1—CHARACTERISTICS OF SOILS USED

SOURCE	LIQUID LIMIT	PLASTICITY INDEX	CLAY %	SILT %	SAND %	MOISTURE ABSORPTION %
Aligarh	26.0	7.80	14.2	17.6	60.1	26.06
Moradabad	28.5	9.50	20.1	25.0	54.0	10.18
Roorkee	29.4	10.15	25.3	32.2	42.5	9.14
Shahjahanpur	30.0	12.40	17.7	23.1	59.2	10.45
Banaras	34.9	14.50	32.4	32.3	35.3	12.92
Calcutta (I)	45.5	17.70	34.4	38.5	28.1	15.23
Calcutta (II)	49.8	21.00	35.2	37.4	27.4	Cracked
Chapra	49.5	23.00	29.2	45.4	25.4	do
Indore black	56.0	27.00	55.2	19.8	25.0	do
Hooghly	56.2	28.50	37.4	42.1	20.5	do

TABLE 2—PLASTICITY INDEX AND MOISTURE ABSORPTION OF NATURAL AND DESIGNED SOILS

SOIL No.	SOURCE	PLASTICITY INDEX OF ORIGINAL SOIL	PLASTICITY INDEX OF DESIGNED SOIL	MOISTURE ABSORPTION OF ORIGINAL SOIL %	MOISTURE ABSORPTION BY DESIGNED SOIL %
1	Banaras	14.5	10.53	12.02	10.50
2	Calcutta (I)	17.7	10.02	15.23	11.20
3	Calcutta (II)	21.0	10.50	Cracked	12.72
4	Chapra	23.0	10.35	do	14.15
5	Indore black	27.0	10.53	do	15.25
6	Hooghly	28.5	10.26	do	13.40

TABLE 3—EFFECT OF CURING AT DIFFERENT TEMPERATURES ON WATER ABSORPTION BY A NON-ERODABLE MUD PLASTER

TEMP. OF CURING °C.	MOISTURE ABSORPTION %	REDUCTION IN MOISTURE ABSORPTION %
30	23.64	—
40	18.50	5.14
50	11.58	12.06
60	9.78	13.86
70	8.99	14.65
80	8.30	15.34

temperatures for 5 hr. and moisture absorption determined after complete immersion in water for 24 hr. (Table 3). With increase in curing temperature, the capacity of the mud plaster to absorb moisture decreases. This effect is quite prominent up to 60°C. and may be attributed to the complete drying of the plaster and possible flow of

bitumen to the voids left unfilled during mixing.

Further work on the subject is in progress.

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