

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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PROJECT REPORT

On

“An Experimental Study on Stabilized Mud Concrete Blocks to Evaluate its Efficiency as a Masonry Material”

Submitted in partial fulfillment of the requirements for the Degree of

MASTER OF TECHNOLOGY

In

INFRASTRUCTURE CONSTRUCTION AND MANAGEMENT

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June 2015

ABSTRACT

Cement and Aggregates (fine and coarse) are basic needs of construction industry. Sand is the most important constituent used in the preparation of cement derivatives such as Mortar, Concrete etc., and incidentally, Sand plays a major role in concrete mix design. In the present day scenario availability of river sand is a burning issue and also a very expensive commodity for construction industry. Under the 12th five year plan, road infrastructure is likely to use about 150 million tonnes of sand and power infrastructure about 90 million tonnes. The Union Ministry of Urban Development had projected a sand shortage of 91,666.7 million tonnes by the end of 2011. The non-availability or shortage of river sand is affecting the construction industry; hence there is a need to find new alternative material to replace the river sand. Many researchers are working with various alternatives to replace river sand and one such alternative may be locally available soil.

Stabilized Mud Concrete (SMC) can be produced using the locally available soil and hence it results in ease and economical construction. In this experimental work, SMC was used to produce (SMC) Blocks and were studied to evaluate its efficiency as a masonry material. SMC Blocks were produced with size of 230 mm x 150 mm (in plan) with varying thickness (height) of Blocks viz., 100mm, 150mm and 200mm. Mix proportion 1: 3: 4.5 (Cement: FA : CA) was considered after studying basic properties of materials and carrying out trial mixes. The FA part consisted of only Natural Soil in some mixes, only Natural Sand in some and their combination in other cases. In addition, local soil was blended with natural sand in varying concentrations (25% and 40%) to study the behavior of SMC Blocks. Mix proportions were named N1, N2, N3 and N4. Stack bonded Prisms were constructed using SMC Blocks with 15mm thick 1:6 (cement: sand) mortar. SMC Blocks were tested for their basic structural properties such as wet compressive strength, flexural strength and the SMC prisms were tested for their compressive strength.

Wet compressive strength of SMC Blocks was found to be 14.62 MPa and its Flexure strength was found to be 4.82 MPa after 28 days of curing which is excellent compared to equivalent masonry elements like first class burnt clay bricks and solid concrete blocks. Typical failure behavior was observed during both compression and flexure tests. The water absorption of SMC Blocks was found to be around 3% which is excellent. Durability of SMC Blocks was studied through alternate wetting and drying process and it was observed that there were no considerable changes in both weight and dimensions of

the blocks. Masonry efficiency of Prisms constructed using SMC Blocks were found to be around 60% which is excellent comparing to a burnt clay brick masonry which would have a efficiency in range of 30% - 40%. It was observed through rate analysis that the SMC Blocks are 30% economical compared to first class burnt clay bricks. It was concluded that SMC Blocks are not only efficient (strength) and economical but also have benefits in other aspects like ease of producing, on site production, minimal infrastructure for producing, energy efficient & eco friendly etc. It is recommended that SMC Blocks can be effectively used as a masonry material in construction of load bearing walls, partition walls, masonry based domes and arches etc.