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A Dissertation Report on

"Strength of Soil-cement block masonry"

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MASTER OF TECHNOLOGY

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By

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ABSTRACT

Stabilized soil has been widely used for the construction of sub-bases of roads and pavements. However the use of stabilized soil for building construction can be seen after forties. Earlier hand compacted stabilized soil blocks were used for the building construction. Development of machine to compact the blocks lead to a new direction in use of soil-cement blocks. At present, there are more than 12,000 soil-cement block masonry constructions. However, there is hardly any study dedicated to the behaviour of soil-cement block masonry using cement-soil mortars. Hence, there is a need for comprehensive study in understanding effect of mortar strength and also the block strength on the strength of soil-cement block masonry. The characteristics of mortar and masonry are examined through an experimental programme.

The Experimental Programme is related to the investigation pertaining to the block characteristics. Three types of soil-cement blocks have been used in the study having different cement content (7.5%, 10% &12.5%). The properties like strength (Wet and Dry compressive), water absorption characteristics (IRA, rate of water absorption and saturation moisture content) have been examined.

The Experimental progamme is also focused on the characteristic behaviour of soil-cement block masonry under different combinations of soil-cement block strengths and mortar strengths. The characteristics like compressive strength and stress-strain relationship for soil-cement block masonry are investigated using 5 blocks high prisms of various combinations of 3 series soil-cement block and two cement-soil mortar proportions 1:1:3 and 1:2:6 (cement :soil: sand).

The results indicate that there is 1.55 times increase in wet compressive strength and 1.47 times increase in dry compressive strength for increase of cement content from 7.5% to 12.5%. IRA decreases with the increase in cement content of the block.

Masonry efficiency lies in the range of 0.42 to 0.52 for the soil-cement block masonry. As Soil-cement block strength was increased from 7.03 MPa to 10.91 MPa, basic compressive

strength for the masonry increases from 0.744 MPa to 1.205 Mpa with cement-soil mortar 1:1:3. and increase of 0.695 MPa to 0.987 MPa with cement-soil mortar 1:2:6. The masonry modulus increases with the increase in block compressive strength. The modulus values lie in the range of 2460MPa to 5731MPa for the soil-cement block masonry. Ultimate strain values for masonry lies in the range of 0.0037 to 0.0054 for wet test conditions while 0.0047 to 0.007 for dry test conditions.