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Durability of compressed stabilised earth blocks

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2013-02-05
http://hdl.handle.net/10539/12393

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ABSTRACT

The world is facing the dilemma of housing its ever increasing population whilst preserving the environment for the needs of future generations. The use of alternative technologies such as the Hydraform compressed stabilised earth block (CSEB) in building construction is burgeoning. The Hydraform block is irregular in shape and thus a specific test method for the assessment of the blocks strength has been developed.

Owing to the Hydraform blocks irregular shape, a specific test method for the characteristic unconfined compressive strength of the Hydraform block had to be developed. Hydraform blocks produced with varying soil properties and stabilised with various cement contents are evaluated by means of the developed test method. Saturated and unsaturated block strengths are evaluated where it has been found that in certain cases as much as half of the dry strength of blocks is lost when blocks become saturated.

Three chemicals, namely Masterseal 550, Masterseal 501 and Acronal S400 are used to waterproof blocks and in turn increase the saturated strength and durability properties of Hydraform blocks.

Compressive strength and other CSEB durability measures such as resistance to abrasion, resistance to water uptake and water sorptivity testing are used as measures of the durability of CSEBs. These measures are used to compare blocks produced without chemicals to blocks produced with chemicals additives.

Through the mentioned durability measures it is found that Masterseal 501 increases the dry and saturated strength properties above that of any other chemical additives. To the contrary, it is found that Masterseal 550 and Acronal S400 completely protect Hydraform blocks against the ingress of water, whereas Masterseal 501 allows water absorption into the blocks. In addition, it has been found that increase of cement concentrations in blocks in the most effective measure to resist abrasion or wind and rain driven erosion.