

MODELING OF THE COMPRESSIVE STRENGTH OF BLOCKS MADE WITH PERIWINKLE SHELLS AS COURSE AGGREGATE

C. E. Okere, J. I. Arimanwa, O. M. Ibearugbulem & I. I. Olali

Research Scholar, Department of Civil Engineering, Federal University of Technology, Futo Owerri, Nigeria

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ABSTRACT

This research work presents Modeling of the compressive strength of blocks made with periwinkle shells as coarse aggregate. Ibearugbulem regression method was used for the development of the models. Eight mix ratios were used in modeling of the block samples. These were 1:6.5:0, 1:6:0.5, 1:5.5:1.0, 1:5.0:1.5, 1:4.5:2.0, 1:4.0:2.5, 1:3.5:3.0 and 1:3.0:3.5. The size of the blocks molded was 125x225x450mm. The materials used for the production of the block samples were cement, river sand, periwinkle shells and portable water. Two curing methods were used; these were a sprinkling of water at 6th, 12th, and 24th hour for 7, 14, 21 and 28 days curing ages, and total immersion in water for the same curing ages after 24 hours of molding of the block samples. A total of 96 blocks were molded for each curing age with 12 blocks for each mixing ratio. These gave a total of 384 blocks for the four curing ages. The blocks were subjected to a compression test after curing. For the first method of curing i.e sprinkling of water, there is a progressive increase in the compressive strength of the blocks as the quantity of periwinkle shells increases. The minimum compressive strength at the 24th hour of sprinkling at 7 days curing age with a numeric value of 3.1190N/mm², while the maximum compressive strength occurred at the 6th hour of sprinkling for 28 days curing age with the numerical value of 28.84 N/mm². For the second method of curing, minimum compressive strength occurs at 7th day of immersion with numeric value of 4.36 N/mm² and the maximum compressive strength occur at 28 days of immersion of the block sample with numeric value of 32.72 N/mm². The models were tested for adequacy using the 95% confident limit using the Fisher's test and found to be adequate. The minimum percentage difference was recorded at 28 days curing and 24th hourly curing by a sprinkling of water with a numerical value of 0.01 while the corresponding maximum value was attained at 7 days curing age at the 12th hourly curing by the sprinkling of water with the numeric value of 22.97. These show that there is no significant difference between the laboratory and model compressive test result. In conclusion, the comparative cost analysis of the periwinkle blocks and normal blocks were calculated, it was found that the periwinkle block gave a 25% saving over the normal block.

KEYWORDS: Blocks, Periwinkle Shells, Mix Ratio, Curing, Compressive Strength, Models