An Investigation of Periwinkle Shells as Coarse Aggregate in Concrete

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An Investigation into using periwinkle shells (PWS) partially or wholly in concrete is reported. Three standard mixes of cement: sand: granite + PWS (1:3, 1:2:4 and 1:3:6) and two design mixes of cement: sand: PWS (1:1 and 1:1) were used. The proportion of shells was varied at intervals of 10% in the standard mixes. Two strength properties (compressive and flexural) were considered. The variations of workability and density of the specimens with different proportions of PWS were also studied.

Results showed that the compressive and flexural strengths decreased with increase in proportion of PWS to granite in the standard mixes. The 28th day strengths for the design mixes were 15.65 N/mm² for 1:1 and 11.77 N/mm² for 1:1 with corresponding densities of 2100 and 1850 kg/m³. The unit weight of PWS was found to be 694.44 kg/m³. This indicates that PWS is a lightweight aggregate. The workability of concrete batches decreased with increase in the proportion of PWS in the mixes. The same trend was observed with the densities of the concrete cubes. The density of concrete containing 100% PWS showed that the concrete produced is lightweight, giving strengths ranging from 11.77 to 15.65 N/mm².