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A Study on the Compressive and Tensile Strength of Foamed Concrete Containing Pulverized Bone as a Partial Replacement of Cement

In this study, structural properties of foamed aerated concrete with and without pulverized bone were investigated. These properties are: workability, plastic and testing densities, compressive strength, and tensile strength at the design density of 1600kg/m3. The tensile strength was evaluated by subjecting 150 x 150 x 750mm unreinforced foamed concrete beams to flexural test and 150 x 300mm cylinder specimens were subjected to splitting test. 150mm cube specimens were used for the determination of both the compressive strength and the testing density of the foamed aerated concrete. The plastic density was investigated using a container of known volume, and its workability determined using the slump test. The pulverized bone content was varied from 0 to 20% at interval of 5%. The specimens without the pulverized bone served as the control. At the designed density of 1600 kg/m³, the results for the control specimens at 28-day curing age are 15.43 and 13.89N/mm² for air and water-cured specimens respectively. The modulus of rupture and splitting tensile strength are 2.53 and 1.63N/mm² respectively. The results for specimens with pulverized bone did not differ significantly from the specimens without pulverized bone. From the results of this investigation, it can be concluded that foamed aerated concrete used for this study has potential for structural applications. Also, pulverized bone can be used to reduce (partially replace) the quantity of cement used in aerated concrete production; thus ridding our environment of potentially harmful wastes, as well as reduce the consumption of non-renewable resources.