

Investigation Into the Effects of Egg Shells Powder and Groundnut Husk Ash on the Properties of Concrete

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Abstract : This study presents an investigation into the improvement of strength properties of concrete using egg shell powder (ESP) and groundnut husk ash (GHA) as additives so as to reduce its high cost and find alternative disposal method for agricultural waste. A standard consistency test was carried out on the egg shell powder and groundnut husk ash. A prescribed concrete mix ratio of 1:2:4 concrete cubes (150mm by 150mm) and water-cement ratio of 0.6 were casted. A total of One hundred and forty four (144) cubes were cast and cured for 3, 7 and 28 days and compressive strength subsequently determined in comparison with the relevant specifications. Consistency test on the cement paste at the various concentrations exhibited an increase in the setting time as the concentration increases with the highest value recorded at 5% egg shell powder and groundnut husk ash concentration as 219 minutes for the initial setting time and 275 minutes for the final setting time as against the control specimen of 159 minutes and 234 minutes for both initial and final setting times respectively. The results of the investigations showed that GHA was predominantly of Silicon oxide (56.73%) and a combined SiO_2 , Al_2O_3 and Fe_2O_3 content of 66.75%; and the result of the investigations showed that ESP was predominantly of Calcium oxide (52.75%) and a combined SiO_2 , Al_2O_3 and Fe_2O_3 content of 3.86%. The addition of GHA and ESP in concrete showed slight different in compressive strength with increase in GHA and ESP additive up to 5% and high decrease in compressive strength with further increase in GHA and ESP content. The 28 days compressive strength of the concrete cubes; compared with that of the control; showed a slight increase. Thus the use of GHA and ESP as partial replacement of cement will provide an economic use of by-product and consequently produce a cheaper concrete construction without comprising its strength

Keywords : additive, concrete, eggshell powder, groundnut husk ash compressive strength

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