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Partial Replacement for Cement and Coarse Aggregate in Concrete by Using Egg Shell Powder and Coconut Shell

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Abstract : The production of cement leads to the emission of large amounts of carbon-dioxide gas into the atmosphere which is a major contributor for the greenhouse effect and the global warming; hence it is mandatory either to quest for another material or partly replace it with some other material. According to the practical demonstrations and reports, Egg Shell Powder (ESP) can be used as a binding material for different field applications as it contains some of the properties of lime. It can partially replace the cement and further; it can be used in different proportion for enhancing the performance of cement. It can be used as a first-class alternative, for material reuse and waste recycling practices. Eggshell is calcium rich and analogous to limestone in chemical composition. Therefore, use of eggshell waste for partial replacement of cement in concrete is feasible. Different studies reveal that plasticity index of the soil can be improved by adding eggshell wastes in all the clay soil and it has wider application in construction projects including earth canals and earthen dams. The scarcity of aggregates is also increasing nowadays. Utilization of industrial waste or secondary materials is increasing in different construction applications. Coconut shell was successfully used in the construction industry for partial or full replacement for coarse aggregates. The use of coconut shell gives advantage of using waste material to partially replace the coarse aggregate. Studies carried on coconut shell indicate that it can partially replace the aggregate. It has good strength and modulus properties along with the advantage of high lignin content. It absorbs relatively low moisture due to its low cellulose content. In the paper, study carried out on eggshell powder and coconut shell will be discussed. Optimum proportions of these materials to be used for partial replacement of cement and aggregate will also be discussed.

Keywords : greenhouse, egg shell powder, binding material, aggregates, coconut shell, coarse aggregates
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