

Effect of Substitution of Crushed Waste Glass as Partial Replacement for Natural Fine and Coarse Aggregate in Concrete.

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Keywords: Waste glass, Fine Aggregates, Coarse aggregate, Compressive strength, Split tensile strength

Abstract: Reusing of waste glass in concrete production is among the attractive option of achieving waste reduction and preserving the natural resources from further depletion thereby protecting the environment and achieving sustainability. This present study examines the possible reuse of waste glass crushed into fine and coarse aggregate sizes as partial substitute for natural fine and coarse aggregate in concrete. The variables in this study is both the fine and coarse aggregate while the cement and water-cement ratio were held constant. The crushed glass was varied from 0 – 100% in steps of 25% by weight to replace the both the natural fine and coarse aggregate in the same concrete mix. Concrete mixes were prepared using a mix proportion of 1:2:4 (cement: fine aggregate: coarse aggregate) at water-cement ratio of 0.5 targeting a design strength of 20 MPa. Tests were carried out on total number of 90 concrete cube specimens of size 150 x 150 x150 mm and 90 concrete cylinder specimens of dimension 100 mm diameter by 200 mm height after 3, 7, 14, 28, 42 and 90 days of curing. Test results indicated that the compressive and split tensile strength of the hardened concrete decreases with increasing waste glass content compared with the control. However, concrete mix made with 25% waste glass content compared significantly well with the control and can be suitably adopted for production of light weight concrete.