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Studies on Mechanical Properties of Concrete and Mortar Containing Waste Glass Aggregate

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Abstract : Glass has been indispensable to men's life due to its properties, including pliability to take any shape with ease, bright surface, resistance to abrasion, reasonable safety and durability. Waste glass creates serious environmental problems, mainly due to the inconsistency of waste glass streams. With increasing environmental pressure to reduce solid waste and to recycle as much as possible, the concrete industry has adopted a number of methods to achieve this goal. The object of this research work is to study the effect of using recycled glass waste, as a partial replacement of fine aggregate, on the fresh and hardened properties of concrete. Recycled glass was used to replace fine aggregate in proportions of 0%, 25% and 50%. We could observe that the Glass waste aggregates are lighter than natural aggregates and they show a very low water absorption. The experimental results showed that the slump flow increased with the increase of recycled glass content. On the other hand, the compressive strength and tensile strength of recycled glass mixtures decreased with the increase in the recycled glass content. The results showed that recycled glass aggregate can successfully be used with limited level for producing concrete. The standard sand was substituted with aggregates based on glass waste for manufacturing mortars, Mortar based on glass shows a compressive strength and low bending with a 1/2 ratio with control mortar strength.

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