Utilization of Sugarcane Bagasse Ash as a Partial Replacement of Fine Aggregate in Grade 45 Concrete

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Nowadays, many investigations focus on ways of utilizing industrial or agricultural wastes as a replacement for the construction industry. In addition to the financial benefits in this regard, such materials may also lead to sustainable products and a pollution-free environment. Sugarcane bagasse ash is one such siliceous and aluminous waste generated in the sugar refining industry apart from ethanol. In this study, fine aggregates in a concrete mixture were partially replaced by untreated sugarcane bagasse ash under different weight percentages: 0%, 10%, 20% and 30%. The untreated bagasse ash was also used as another raw material in the concrete mix apart from other raw materials: fine aggregates, coarse aggregates, cement and water. The compressive strength measured at 28 days was considered to determine the optimum ash content for the concrete mix. In this optimum range, the highest value range for compressive strength is found. Accordingly, the optimum ash content should be between 0% - 10%, if sugarcane bagasse is used as a partial replacement to fine aggregates. However, when added in addition to the existing materials (without partial replacement), the outcomes for the compressive strength have not found to be favourable. The compressive strength is comparatively low in this case compared to the full replacement scenario. This study thus concludes that high strength concrete can be made by utilizing sugarcane bagasse ash as a partial replacement of fine aggregate.

***Keywords*:** Compressive strength; Sugarcane bagasse ash; Sugarcane bagasse; Agricultural waste