



## Comparative Studies On The Partial Replacement of Cement With Selected Ashes In Concrete Production Using Bida Natural Stones

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### Abstract

*In this research two different ashes were separately used as partial replacement for cement in concrete production. They include Rice Husk ash (RHA) and Bone Powder ash (BPA). Mix design of 1:2:4 were adopted. The ashes were obtained through open air burning. Sieve analysis, Specific gravity tests, Bulk density, Moisture content, Aggregate Impact Value (AIV) and Aggregate Crushing Value (ACV) were carried out on the aggregates. Workability test was carried out on fresh concrete containing the two ashes RHA and BPA to ascertain the compressive strength of concrete containing ashes as partial replacement for cement. Concrete mix were prepared at 100% OPC as control, three trial mix each of RHA and BPA at cement replacement of 5%, 10%, 15%, 20% and 25%. Compressive strength test was carried out on concrete at 7, 14, 21 and 28 days. The result showed that 5% RHA has compressive strength is close to control in concrete at 28 days while that of 5% BPA was not too close to the control at the 28 days. Also from the results obtained it was observed that the partial replacement of cement by RHA and BPA is advantageous, particularly for areas at which the concrete can utilize such as columns, slab, foundation and beam at 5% replacement.*

**Keywords:** Concrete, Rice Husk Ash, Bone Powder Ash, Cement, Replacement, Workability.

### 1.0 Introduction

The World's demand for concrete over the last three decades have sky-rocketed since concrete has become the material of choice for the construction and development of physical infrastructure. This is because of the higher flexibility offered by its use of concrete and its low cost to strength ratio compared to wood and steel (Mamlouk and Zainiewski, 2006). Concrete production requires large volume of earth materials, the continuous exploration or excavation of which depletes the earth and causes ecological strain (Sagar *et al.*, 2019). In recent times, the use of agricultural, industrial and agro-industrial waste in concrete production as partial or full replacement of the conventional concrete ingredients (cement, river sand and stones) has become attractive to environmental and material scientists and researchers all over the world (Asma *et al.*, 2015).