

ABSTRACT

Concrete is the main construction material used in the construction industry and has some shortcomings in that it is expensive due to the high cost of cement. Due to this a mixture of bone and coffee husk ashes has been proposed to be used in partial replacement of cement in concrete.

In Concrete technology, several ashes are being used to help carry out researches on how the different ashes affect the concrete performance. Wood ash, Silica fumes, Rice husks ash just to mention but a few. In this research, Bone ash and coffee husks ash is what was used to do the research and several tests were carried out in accordance to the British Standards. Partial replacement of cement was carried out in concrete to determine their effect on concrete strength. Increasing proportions of partial replacement of cement using bone and coffee husk ashes resulted in a decrease in concrete strength. At 0% replacement 7-Day and 28-Day compressive strength was 30.453 MPa, 42.905 MPa respectively. At 20% Bone Ash 29.481 MPa, 42.111 MPa. At 10% Bone Ash and 10% Coffee Husks Ash, the strengths are 22 MPa and 35 MPa. At 20% Coffee Husks Ash, the compressive strength was 15.09 MPa and 22.846 MPa. At 15% Bone Ash and 5% Coffee Husks Ash, the compressive strength was 20.44 MPa and 29.022 MPa. At 15% Coffee Husks Ash and 5% Bone Ash, the compressive strength was 18.23 MPa and 26.205 MPa.

The optimum replacement was used in making concrete mixes. The compressive strengths obtained at 28 days were 42.905 MPa for the control mix and 42.111 MPa for the samples with 20% partial cement replacement with bone ash. The splitting tensile strengths obtained at 28 days were 3.432 MPa for the control sample and 2.953 MPa for the samples with 20% cement replacement. The densities of hardened concrete at 28 days were found to be 635.613 Kg/m³

for the control samples and 588.443 Kg/m³ for the samples with 20% cement replacement. This showed a decrease in concrete strength upon addition of ashes. Partial replacement of cement in concrete was found to produce concrete of lower strength, indicating that this replacement can only be used in concrete that does not require high strengths. The optimum replacement was found to be 20% partial cement replacement with Bone Ash.