

ABSTRACT

Increase in the demand of conventional construction materials and the need for providing a sustainable growth in the construction field has prompted designers and developers to opt for alternative materials feasible for use in construction. For this objective, the use of industrial waste products and agricultural by products are very constructive. These industrial wastes and agricultural by products such as fly ash, silica fume, and rice husk ash can be replaced partially with cement because of their pozzolanic behavior.

In this investigation groundnut shell ash, saw dust ash and rice husk ash all being agricultural by product, were blended in ash form and tested to see their viability as a natural pozzolan. The blended ash was replaced partially with cement at percentages of 5%, 10%, 15%, and 20% and its mechanical properties of concrete tested. The chemical composition of the blended ash showed that it was highly pozzolanic since it contained a combined average percentage of Silica (SiO_2), Iron Oxide (FeO_3) and Alumina (Al_2O_3) of about 88% which is greater than the minimum requirement of 70% by ASTM C 618. The optimum percentage replacement was found to be 15% which obtained a 28 day compressive strength of 30.81N/mm² thus maintaining the class it was originally designed for in the mix design (Concrete class 30). All in all agricultural waste ash proved to be a feasible alternative material for use in construction and production of green cement.