

ABSTRACT

The use of rice husk ash as a partial replacement of cement could potentially offer a variety of benefits such as enhancing sustainability, reduction in construction costs and improving the environmental impact of concrete production. The aim of the study was to assess the performance of a proposed Rice Husk Ash (RHA) based concrete mix design using CEM I and CEM II. The study was conducted in two main phases. The first phase (Phase I) involved the determination of two strength parameters that would relate the properties of OPC concrete to that of RHA concrete and hence determine the optimum percentage replacement of cement with RHA. The second (Phase II) involved incorporating the strength parameters into the Building Research Establishment's (BRE) mix design procedure for design of normal concrete mixes so as to obtain proportions of cement, sand, gravel, water and RHA that would enable the concrete to meet specified properties of workability and compressive strength. The concrete was then mixed, casted in 150mm cubes and cured for 28 days. The slump test and compressive strength test were conducted to investigate whether the target slump and target strength were achieved. Results indicate that the optimum RHA content as a percentage replacement of cement is 15% for CEM I and 10% for CEM II. It was observed that the presence of RHA in concrete reduced the concrete's workability therefore resulting in greater water demands. All but one concrete mix were able to achieve the target slump therefore indicating that the differential lubrication factor is a useful factor in adjusting the water/binder ratio for RHA mixes. Furthermore, it was noted that none of the concrete mixes were able to achieve the target strength. This could be as a result of the high amount of water content in the mixes that resulted in reduction of the compressive strength of the samples. It was therefore recommended that incorporating a mix design procedure that restricted the design values for water/binder ratio would ensure that the target strength was met.