EVALUATION OF MECHANICAL AND DURABILITY PROPERTIES OF PORTLAND SLAG CEMENT WITH PARTIAL REPLACEMENT OF CEMENT BY DIFFERENT MINERAL AND CHEMICAL ADMIXTURES

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ABSTRACT

The construction industry is now slowly becoming aware of the environmental issues and other sustainable development issues for cement and concrete industries. It is looking for the ways and means to develop building products, which will increase the life span and quality. In this regard the merits of using certain industrial by products such as fly ash, ground granulated blast furnace slag, microsilica, and rice husk ash have been well recognized by the construction industry.

Therefore, it should be obvious that certain scale cement replacement with industrial by products is highly advantageous from the stand point of cost, economy, energy efficiency, durability and overall ecological and environmental benefits. In the present investigation an attempt is made to find various properties based on the experimental results, mathematical models were elaborated to predict the strength of mortar cubes with partial replacement of cement by different admixtures with 5% of total powder content by weight. Strength of cubes with Portland Slag Cement (PSC), after 3,7,28 ,90 days and 360 days of curing and also durability tests after 60 days, were analysed to evaluate the effect of addition content, the time of curing and the compressive strength changes.

The investigation revealed that use of waste materials like fly ash, ground granulated blast furnace slag, microsilica and rice husk ash, which are otherwise hazardous to the environment may be used as a partial replacement of cement, which leads to economy and in addition by utilizing the industrial wastes in the useful manner the environment pollution is also reduced to great extent and which leads to sustainable development. Out of all these admixtures used microsilica gives best results when compared to other admixtures used with and without super plasticizer.

KEYWORDS: Compressive Strength, Durability, Fly Ash (FA), Ground Granulated Blast Furnace Slag (GGBS), Micro Silica (MS), Rice Husk Ash (RHA), Superplasticizer