

PRODUCTION AND PROPERTIES OF RICE HULL ASH CEMENT

D.R.K. Lokuliyana*, R.P. Gunawardene**

Ceylon Institute of Scientific & Industrial Research, Colombo 7.**Dept. of Chemistry, University of Peradeniya.*

Rice hull is one of the major agricultural by products in Sri Lanka. Therefore, it is of interest to examine the possibility of using this waste material in the production of a cementitious material. In the present study investigations have been made to determine the optimum conditions for the production of rice hull ash cement. Important properties of the product such as compressive strength, setting times and hydration have also been investigated.

A cement can be made by grinding a mixture of rice hull ash and hydrated lime in a ball mill. No heat treatment is required. The most suitable ratio of rice hull ash and hydrated lime was found to be 8 : 3 respectively. Amorphous silica and Ca(OH)_2 have been identified as the major constituents in the product. The compressive strength of the product is found to be in between the values for portland and masonry cements. On hydration, compressive strength of the product increases rapidly up to 07 days and then increases slowly with time.

Main hydration products have been identified as tobermorite gel, dicalcium silicate hydrate, xonolite and tobermorite type of calcium silicate hydrate. The binding property of the cement can be mainly attributed to the formation of tobermorite gel and dicalcium silicate hydrate. Observed variations of compressive strength of rice hull ash cement with the composition, water/cement ratio, grinding time and curing period also will be discussed.