Performance of RiceHusk A Geopolymer Concrete

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Abstract: Environmental issues resulted from cement production have become a major concern today. To develop a sustainable future it is encourage tol imit the use of this constructi on material that can affect the environment. Geopolymer is the best solute on reduce the use of cement in concrete. Geopolymer is the hardened cementiouspaste made from flyash, alkaline solution nand geological source material .Fly ash is finely divided powder produced by coal and fired power station .RHA is the bye-product of paddy industry. RHA is rich in silicaabout90%,5%carbonand 2%K2O.ThespecificsurfaceareaofRHAisabout40-100 m2/g. Asper study it is found that incorporation of RHA upto 30% replacement level reduces the chloride penetration, decreases permeability and strength and corrosion resistance properties.

Keywords: Physio-Chemical Analysis, Ground water samples, Landuseand Salem

INTRODUCTION

Geopolymer are inorganic materials that form long range, covalently bonded, non-crystalline networks. Commercially produced geopolymers may be used for fireand heat resistant coatings and adhesives. According to T.F. Yen, geopolymers can be classified in to two major groups: pure inorganic geopolmers and organic containing geopolymers of naturally occurring macromolecules. The main constituents of geopolymers, namely source material and the alkaline liquids. The source materials for geopolymers based onalumino-silicate should be richinsilicon(Si) and Aluminium(Al).Usuallyit would be by-products suchas flyash, silica fume, rice husk ash, GGBS, red mud etc., The choice of source material for making geopolymer depends on factors such as availability, cost, type, application and specific demand of the end users.

The most common alkaline liquids used ingeo-polymerisation is a combination of sodium hydroxide (NaOH) or potassium hydroxide (KOH) and sodium silicate or potassium silicate. Geopolymer concrete can be produced from ground granulated blast furnace slag (GGBS) and alkaline liquids. Water is added to the concrete only for workability and easiness in placing the concrete. On the other hand, in Portland cement, water is necessary for the hydration of cement. The fundamental unit within age of polymer structure is tetrahedral complex on sisting of Si or Al coordinated through covalent bonds of four oxygens. The geopolymeric framework results from the cross-linking between these tetrahedral, which leads to a 3-dimensional alumino-silicate network where the negative charge associated with tetrahedral aluminium is balanced by a small cationic species, most commonly an alkali metal cation.

II. COLLECTION OF LITERATURE

Greenhouse effect is a natural phenomenon. It refers to the atmosphere capability to prevent part of sun radiance to go back into space.The mechanism insurest hate art have rage temperature is kept between-18°Cand15°C.Gases which allow this phenomenon arenotnaturallyhighlyconcentratedintheatmospherebuthumanactivitieshavebeenincreasingthoseconcentrations.Therefore atmosphere characteristics and greenhouse effect has been altered. This alteration often considered as the main cause of global warming. Over the last century, carbon dioxide concentration in the atmosphere has increased of 30% and it is estimated that in 2013, CO2, with approximately 467 million tonnes (Mt), represented 83% of UK's greenhouse emissions. In general, this report will not deal with other gas but whenCO2e will be considered, they are considered to be included. It is this massive participation

That makes of CO2 the priority of any policya imingare duction of green house emissions. However, because their global warming potential is greater than the one of CO2, these other gas must be kept in mind and further studies might be carried out.

Increasingeconomicgrowthdemandsmoreeffectiveutilizationofbothrenewableandnon-renewableresources.Ifnotcarefully targeted, this will lead to production of an increased amount of waste. Additionally, waste handling companies treat numerous waste flows generated in different industrial areas which have no tyet found major industrial applications. Legislati on and taxation are becoming more stringent, and consequently, waste disposal costs are increasing. This has resulted in increasing interest in the search for novel utilization possibilities for the waste flows generated.

III. NUMERICAL ANALYSIS

The various mix combination sthat are to be casted areF90R10,F80R20,F70R30using three different samples of rice husk ash. In this research work the compressive strength of Geopolymer concrete is examined for the mixes of 10 Molarity of sodium hydroxide. Themolecularweightofsodiumhydroxideis40.Toprepare10Molarityofsolution400gofsodiumhydroxideflakesareweighed andtheycanbedissolvedindistilledwatertoform1litresolution.Volumetricflaskof1litercapacityistaken,sodium hydroxide flakes are added slowly to distilled water to prepare 1liter solution.

IV. THEORETICAL ANALYSIS

As there are no code provisions for the mix design of geopolymer concrete, the density of geo-polymer concrete is assumed as 2400 Kg/m3. The rest of the calculations are done by considering the density of concrete. The total volume occupied by fine and coarseaggregateisadoptedas77%.The alkaline liquid to flyash and GGB Sratioiskeptas0.4.The ratio of sodium hydroxideto sodium silicate is kept as 2.5.The conventional method used in the making of normal concrete is adopted to prepare geopolymer concrete.

V. EXPERIMENTAL TEST

Firstly, the fine aggregate, coarse aggregate, fly ash and GGBS are mixed in dry condition for 3-4minutes and then the alkaline solution which isa combination of Sodium hydroxide solution and Sodium silicate solution with super-plasticizer is added to the dry mix. Water is taken as 10 % of the Cementous material (fly ash and GGBS). The super plasticizer is taken as 3% of the Cementous material. The mixing is done for about 6- 8 mins for proper bonding of all the materials. After the mixing is done, cubes are casted by giving proper compaction in three layers.

Thespecimenistobeleftundisturbedforabout 48hoursbecauseof longer setting time.

The following are the materials required for 1m3 of concrete:

Fig. 1:Mixing of binders and aggregates

VII. RESULTS AND DISCUSSION

CONCLUSION

TheuseofRHAaspartialreplacementofcementinmortarandconcretehasbeenextensivelyinvestigatedinthispaper.The following are the conclusions that are drawn from this study: Concrete requires approximate increase in water cement ratio due to increase in percentage of RHA. Because RHA is highly porous material. The workability of RHA concrete has been found to decrease within crease in RHA replacement. It was found thatricehusk when burnt produced amount of silica(morethan80%).Forth is reason it provides excellent thermal insulation. Rice huskash contains moresilica, and hencewepreferricehuskashuseinconcretethansilicafumetoincreasethestrength.Though Ricehusk as his harmful for humanbeing, but the cost of ricehusk as his zero and thus wepreferRHAuseinconcrete as compared to silica fumes.

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