Study On Comparision of Self Curing Concrete by Using Normal Coarse Aggregate And Recycled Coarse Aggregate

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***Abstract*- A self – curing concrete is provided to absorb water from atmosphere to achieve better hydration of cement in concrete which solves the problem of lowered cement hydration because of improper curing and thus unsatisfactory properties of concrete. The present investigation involves the use of self – curing agent viz., polyethylene glycol (PEG) of molecular weight 6000 (PEG 6000) for dosages ranging between 0.5 to 2% by weight of cement added to mixing water. The experimental program was planned for a total of 120 cubes, 120 cylinders and120 prisms were cast which involves different dosages (0%, 0.5%, 1% and 2%) of self-curing agent PEG-6000 for four different mixes (Mix 30 and mix 40), Under different curing conditions (indoor, conventional) with different aggregates (normal coarse aggregate and recycled coarse aggregate).Comparative studies were carried out for self-curing of recycled coarse aggregate and self-curing of normal coarse aggregate. Comparative studies were carried out for water retentivity , compressive strength, split tensile strength, flexural strength after 28 days for conventional cured and self-cured concrete. The properties of self – cured concrete are at least comparable and sometime better than those of concrete with traditional curing.**

The experimental investigation shows that increase in SCA from 0% to 2% there is increase in strengths obtained. From concrete using normal coarse aggregate has shown a greater compressive strength, Flexural Strength, Splitting Tensile Strength compared to recycled coarse aggregate. And when compared to conventional curing there is a greater strength obtained for self-curing concrete.

I. INTRODUCTION

The Curing is the process of controlling the rate and extent of moisture transport from concrete during Cement hydration. It may be either after it has been placed in position (or during the manufacture of concrete products), thereby providing time for the hydration of the cement to occur. Since the hydration of cement does take time in days, and even weeks rather than hours curing must be undertaken for a reasonable period of time, if the concrete is to achieve its potential cement hydrates. The curing period may depend on the properties required of the concrete, the purpose for which it is to be used, and the ambient conditions, i.e. the temperature and relative humidity of the surrounding atmosphere. Curing is designed primarily to keep the concrete moist, by preventing the loss of moisture from the concrete during the period in which it is gaining strength.

Conventional Curing Methods

Methods of curing concrete fall broadly into the following categories:

Minimise moisture loss from the concrete, for example by covering it with a relatively impermeable membrane.

Prevent moisture loss by continuously wetting the exposed surface of the concrete.

Steam curing.

Ponding or spraying the surface with water.

Difficulties in conventional curing methods

For the vertical member it is not possible to keep the surface moist as in case of the flat surfaces.

In the places where there is scarcity of water.

In the places where manual curing is not possible

A human error may leads to the cracking in the member and also decreases its strength i.e when curing water is not provided at the right time.

"Self-curing concrete" means that no labour work is required to provide water for concrete, or even no any external curing is required after placing which the properties of this concrete are at least comparable to and even better than those of concrete with traditional curing.

Self-curing is an "internal curing system" where a water- soluble polymer is added to the concrete mix. This method overcomes the difficulty in ensuring that effective curing procedures are employed by the construction personnel as the internal curing composition is a component of the mix.

II. LITERATURE REVIEW

WEN-CHEN JAU (SELF CURING CONCRETE) (2008)

The objective of the research was to find out the effect of high performance self-curing agent on strength characteristics of self-compacted concrete in comparison with ordinary concrete (with different curing conditions).The self-curing agent used in this study was poly acrylic acid (PAA) and polyvalent alcohol. These two chemicals are most hydrophilic in nature. The dosage of self-curing agent was 1% and 2% by weight of cement. Compressive strength and water retentivity test was carried under different relative humidity conditions like 50%, 67.5% and 85%.

ROLAND TAK YONG LIANG AND ROBERT KEITH SUN (2002)

The objective of the research was to produce self-curing concrete by using hydrophilic chemicals like polyethylene glycol and paraffin wax. Many experiments have done on ordinary concrete like compressive strength at different days of curing and also at different proportions of PEG and wax.

Claims on internal curing compositions

A cementitious mix comprising of cement and aggregate, further including an internal curing concentrate which includes a glycol, a wax and water.

The cementitious mix wherein the glycol was a polyethylene glycol of molecular weight 200 and wax was selected from the group consisting of paraffin wax.

A cementitious mix including an internal curing concentrate wherein the internal curing concentrate comprises about 10% polyethylene glycol, about 57% paraffin wax, and about 33% water.

A cementitious mix where in the internal curing composition was present in the cementitious mix in an amount of about 5 l/m3.

R.K. Dhir, P.C. Hewlett and T.D. Dyer (1994)

This paper reports the results of a series of durability tests conducted on self-cure concrete. The tests were the initial surface absorption test, the potential difference (PD) chloride diffusion test, and depth of carbonation, half-cell corrosion potential and measurement of freeze / thaw resistance.

Three mixes were used throughout the programme : one containing only OPC as a binder, one containing a 40% GGBS cement replacement and one containing PFA as a 30% cement replacement. Two dosages were used: 0.005M and 0.l00M.Two sets of control specimens were cast, kept under damp hessian and polythene for 24 hours and then stripped. One set was cured in air at 20°C/ 60%RH for 28 days. The other set were kept for the same amount of time in the same conditions, but sealed in a water-resistant plastic film to ensure that no moisture was lost. The self-cure concrete specimens were also cured in air at 20°C /60%RH.

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