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A STUDY ON SELF-CURING CONCRETE USING POLYETHYLINE GLYCOL

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ABSTRACT

The reason of this investigation to study about strength and properties of concrete using water soluble polyethylene glycol as the self curing agent agent. The property of self curing agent polyethylene glycol is to reduce the water evaporation from the concrete and hence it increase the water holding capacity of concrete .the necessity of self curing admixture is very important from the point of view of saving water. Self compacting concrete is prepaired so that it can be placed congested reinforcement and self curing is done to full-fill the water requirement of concrete. In the present observation involves use of self curing agent viz. (PEG) for dosages 0.1 to 1% by weight of cement adding to mixing water.

Keywords:- self curing ,polyethylene glycol (PEG),water retention, compressive strength.

I. INTRODUCTION

It is the procedure use for promoting hydration of cement and it consist of a control of temperature and of moisture moment from an into the concrete. Curing allow continuous hydration of cement and continuous gain in the strength, once curing stop strength gain of the concrete also stop proper moisture conditions are critical because of hydration of the cement.

1.2 Requirement For Self Curing

Whenever the admixtures react completely in a blended cement system, the demand for curing water (external or internal) can be much greater than that in a conventional ordinary Portland cement concrete. The empty pores create self desiccation. when concrete is exposed to the environment

1.3 Significance Of Self Curing Concrete

When the water is not radially available, significant autogenous deformation and (early age) cracking may result. Due to the chemical shrinkage occurring during cement hydration, empty pores are created within the cement past, leading to a reduction in its internal relative humidity and also evaporation of water takes place and loss of moisture will reduce in the initial water cement ratio which will result in the incomplete hydration of the cement and hence lowering the quality of the concrete. Various factors such as wind velocity. Relative humidity, atmospheric temperature, water cement ratio mix and type of the cement use in the mix. Evaporation in the initial stage leads to plastic shrinkage cracking and at the final stage of setting it leads to drying shrinkage cracking. curing temperature is one of the major factor that affect the strength development rate. At elevated temperature ordinary concrete losses its strength due to the formation of the cracks between thermally incompatible ingredients, cement paste and aggregate . to shrinkage which may cause early age cracking. Continuous evaporation of moisture take place from exposed surface due to the difference in a chemical potential (free energy) between the vapour and liquid phages.

1.3 Potential material for internal self curing

The following material can provides.

1.Light weight aggregate (natural synthetic, expended shale)
2.Light weight of sand (water absorption
3.light weight of cource aggregate (water absorption is 20%
4.Super-absorbent polymers (60-300 mm size)
5.Shrinkage Reducing admixture
6.wood powder Scope and objectives

The specific water soluble chemical such as polyethylene glycol and polyvinyl alcohol added during the mixing can reduce the water evaporation from the concrete or within the set of concrete, making it ‘self curing’. The chemical should have ability to reduce evaporation from solution and improve water retention in ordinary Portland cement. The compressive and tensile strength of self curing concrete for 7and 28 days is found out and compaired with conventional concrete of similar mix design.

EXPERIMENTAL INVESTIGATION

Material: The following material are used in investigation

Ordinary Portland Cement(OPC)

In this study ordinary Portland cement grade 53 which is known for high durability or high quality is used.

Course Aggregate

In this course aggregate are used pass from 20mm and retain on 10mm well graded cubical or rounded aggregate are desirable. aggregate should uniform quality with respect to shape and grading. specific gravity of coarse aggregate used here is 2.71.

Fine aggregate

Grading must be uniform throughout the work ad must pass through 4.75 mm sieves size which confirms to the code IS :383-1970. Particles smaller than 0125mm size are considered as fines which contribute to the powder content. Specific gravity of fine aggregate used is 2.17 and fineness modulus 3.2 is used for this study.

WATER

Potable water available in laboratory was used for casting all the specimens. the quality of water was found to satisfy the requirements of IS:456:2000

PEG

Polyethylene glycol is a condensation polymer of ethylene oxide and water with general formula H(OCH2C2) n(OH),where n is the average number of repeating ox ethylene groups typically from4 to 180.the abbreviation (PEG600) is termed in combination with a numeric suffix which indicates average molecular weights. The common feature of peg appears to be water soluble nature polyethylene glycol is non toxic, odourless, neutral lubricating, on volatile and non lubricating and is used in variety of pharmaceuticals

4.METHODOLOGY OF EXPERIMENT

Experimental program is carried out in different stages. First preliminary tests are conducted in fine aggregate ,coarse aggregate and cement. The test includes particle size distribution of fine aggregate and coarse aggregate, specific gravity of cement.

Specific gravity of fine aggregate, specific gravity of coarse aggregate. with tet data of the material obtained the concrete mix design for M20 grade and M25 grade is designed using IS:10262:2009 and IS: 456:2000.6 set of cube and 3 cylinders are casted for both grades of concrete. Compressive test and split tensile test are conducted to determine the and split tensile test are conducted to determine the properties of normal concrete of both M20 and M25 grades. In the second stage of project thee experimental program was designed to investigate the strength of self curing concrete by adding polyethylene glycol PEG(400) at 0.5%, 1%, 1.5% and 2% by weight cement of concrete 6 set of cube having 15x15x15 cm of size and 3 numbers of cylinder block where casted and to determination or tasted for compressive strength and split tensile strength for the both grades of that is m20 and m25. The casted concrete where removed from mould and kept them at room temperature by placing them in curing. The compressive strength at 7 days strength at and 28 days and split tensile strength at 28 days of curing were studed. Finally the strength compression of self curing comparison and normal mix concrete was performed.

CONLUSION

Optimum dosage of PEG400 for maximum strength that is compressive strength was found to be 1% The percentage of PEG400 is get increasing the value slump as well as Compaction factor is increase. Self curing concrete is an alternative to conventional to conventional concrete in desert regions where scarity of water is major issue. The strength of self curing concrete is on equal with conventional conventional concrete. Self curing concrete is answer to the many problem face due to the lack of proper curing.

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