REVIEW PAPER ON EFFECT ON CONCRETE PROPERTIES USING VARIOUS METHODS OF CURING CONCRETE

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Abstract

The properties of concrete, especially the durability are generally influenced by curing. It has effect on the hydration of the cement. Due to technological improvement in curing techniques and introduction of several chemical compounds, a considerable enhancement in the properties of concrete is observed today. Self-Curing agents prove to be suitable in dry regions. In this review paper, effort has been made to understand the working efficiency of various curing methods which are generally adopted in the construction industry**.**

Index Terms - Wrapped Curing, hardened properties, durability, curing compounds and curing efficiency.

I. INTRODUCTION

In present phase, concrete has proved itself to the most important element in construction. Therefore the portion of concrete is an important factor for strength and durability. Concrete is the extensively used man made material in the world. It has been used for construction of pavement, dam, bridges, building, tunnels etc. In 1999, Lambert Co-operation attempted to introduce that concrete curing is the treatment of newly placed concrete during the period in which it is hardening, so that enough is retained so that it can reduce cracking and shrinkage. It is renowned that curing is the most essential part in obtaining the desired structural and durability properties of concrete. Two main categories of curing of concrete are: those that maintain availability of water and those that minimize the loss of mixing water from concrete by sealing its exposed surfaces. The availability of curing materials, the size and shape of structure, environmental conditions etc. are necessary in judging which curing method will be suitable to adopt. Traditionally, quality of concrete in construction work is calculated in terms of its 28 days compressive strength. If after 28 days, the quality of concrete is found to be dubious, it would have been buried by subsequent construction.

II. LITERATURE REVIEW

Most of the researches have worked in publishing their work in comparison of different curing method on the compressive strength of concrete. The observation, methodology, conclusions and further scope of work are used to finalize the objectives of present work. The available literature of review is as follows:

A.S.Thakare(2016) this paper presents the comparison between the Self Cured Concrete and Conventionally Cured Concrete. This work includes the Designing, Casting and Testing of Cubes, Beams, and Cylinders of various grade of concrete [M20 to M40]. Now a day's most of the region are facing scarcity of water, lack of good workmanship. There are various method of curing in whichwater is the necessary thing for curing, but due to deficiency of available water this type of water curing method are not favorable for arid region mostly, this methods are also Uneconomicalas various point of view. The aim of this paper is to apply another method of curing to overcome mentioned problems and after applying such method we used to compare the result. The various set of Cube, Beam and Cylinder was cast for different grades, water curing method and self-curing method by using plastic sheet we use to take different grades, after done all this procedure we used to compare results for both. The result reveals that Self Cured Concrete maintained higher strength till 14 days as compared to Conventionally Cure Concrete but after 28 days both results are reached up to their Target Strength.

Obam (2016) Different methods are usually adopted to cure concrete. Concrete strength partly depends on the method and duration of curing. The structural use of concrete depends largely on its strength, especially compressive strength. This study uses three curing methods to determine their effects on the compressive strength and density of concrete. These methods are immersion of concrete cubes in curing tank (Ponding), covering of cubes with wet rug (Continuous wetting) and the use of polythene sheet (Waterbarrier). Laboratory experimental procedures were adopted. A total of sixty (60) cubes were cast with 1:2:4 mix ratios. The cubes were cured in the laboratory at room temperature. The results showed that the average compressive strength values for 28-day curing vary with curing methods. The cubes cured by immersion have an average compressive strength of 29.7 N/mm2 while the ones cured by wet rug and polythene sheet have average compressive strength of 26.8 and 24.7 N/mm2 respectively. The traditional curing by immersion appeared to be the best method to achieve desired concrete strength.

AbdulkadirCüneyt Aydin (2015) In this paper an attempt has been made to study the use of micro-silica on the properties of self-ompacting-concrete (SCC) such as compressive strength, splitting tensile strength, flexural strength, ultrasonic pulse velocity (UPV) and micro-hardness when exposed to different atmospheric steam curing temperatures. The influence of micro-silica as partial replacement of cement on the properties of SCC is investigated. In this study, mixes were prepared with three percentages of microsilica ranging from 5% to 10% and one controlled mixture without micro-silica was also prepared for comparison. The specimens of each concrete mixture were heated upto different temperatures (65◦C, 70◦C and 75◦C). The variables included were the temperature effects (65◦C, 70◦C and 75◦C) using Cem I 42.5. SCC mixes enhanced atmospheric steam curing compressive strength ranging from 29.20 to 38.50 MPa, flexural strength ranging from 4.95 to 6.56 MPa and splitting tensile strength ranging from 1.18 to 1.63 MPa. Test results clearly show that there is little improvement in the compressive strength within temperature range of 70◦C as compared to 65 and 75◦C, although there is little reduction in splitting tensile strength ranging from 65 to 75◦C and with the increase in percentage of microsilica. However, the rate of splitting tensile strength and flexural strength was higher than that of the compressive

strength at elevated temperatures and with the increase in percentage of microsilica. In this paper, scanning electron microscopic (SEM) observations were also made to explain the observed residual compressive strength increase between 65◦C, 70◦C and 75◦C.

B. Siva Konda Reddy(2014) Concrete is the most widely used man-made building material on the planet. The reaction of OPC with water results in hydration products, which glue the reacting cement particles together to form a hardened cement paste. When cement & water are mixed with sand and coarse aggregate the resulting product is called concrete. Till now potable water is used for mixing different ingredients of concrete. This paper finds new method of using this potable water by magnetizing which can be used in mixing and curing of concrete. Strength tests conducted on this magnetic water concrete (MWC) showed encouraging results and one can easily replace normal water with magnetic water for mixing and curing of concrete.

T. James (2011) Different curing methods are usually adopted to evaluate the compressive strength of concrete. This study reports the laboratory results of the effect of curing methods on the compressive strength as well as the density of concrete. A total of 72 cubes of mix ratio 1:2:4 were investigated after subjecting them to various curing conditions, with the aim of finding which of the curing method is best. The cubes were cured in the laboratory at an average temperature of 28°C (82.4°F). The results obtained showed that the average compressive strength values for 7, 14, 21 and 28 days, vary with curing methods. The results show that ponding had the highest compressive strength and density, followed by wet covering, sprinkling ,then uncured for two days, with the totally uncured cubes having the least compressive strength and density as well as highest shrinkage limit. Ponding method of curing was recommended to be the best of all the curing methods.

K. Vijai (2010) In order to address environmental effects associated with Portland cement, there is need to develop alternative binders to make concrete. An effort in this regard is the development of geopolymer concrete, synthesized from the materials of geological origin or by product materials such as fly ash, which are rich in silicon and aluminum. This paper presents results of an experimental study on the density and compressive strength of geopolymer concrete. The experiments were conducted on fly ash based geopolymer concrete by varying the types of curing namely ambient curing and hot curing. The ratio of alkaline liquid to fly

ash was fixed as 0.4. For all the samples the rest period was kept as 5 days. For hot curing, the temperature was maintained at 60oC for 24 h in hot air oven. The compressive strength test was conducted for each sample and the results showed that there is an increase in compressive strength with the increase in age for ambient cured specimens. For hot cured samples the increase in compressive strength with age was very less as compared to that of specimens subjected to ambient curing. The density of geopolymer concrete was around 2400 kg/m3 which is corresponding to that of conventional concrete.

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