

STUDY AND DESIGN OF SELF CURING CONCRETE FOR M30 GRADE

Tuptewar Shriprasad Madhavrao¹, Unde Rajeshwar Houshiram¹, Rukare Suraj Sangappa¹,
Salunkhe Shubhamkumar Suresh¹

Prof. Shreedhar Patil², Prof. Mayur Tanpure²

¹(Dept. of Civil Engineering , Dr. D. Y. Patil S.O.E.T., Lohegaon, Pune - 411047)

²(Dept. of Civil Engineering , Dr. D. Y. Patil S.O.E.T., Lohegaon, Pune - 411047)

Abstract - Water retention of concrete containing self-curing agents is investigated. Concrete weight loss and internal relative humidity measurements with time were carried out, in order to evaluate the water retention of self-curing concrete. Non-evaporable water at different ages was measured to evaluate the hydration. Water transport through concrete is evaluated by measuring absorption%, permeable voids%, water absorptivity, and water permeability. The water transport through self-curing concrete is evaluated with age. The effect of the concrete mix proportions on the performance of self-curing concrete.

Key Words: Poly ethylene glycol, super absorbent polymers i.e. wood fibres, water retention.

1. INTRODUCTION

Concrete is the basic engineering material used in most of the civil engineering structures. It is basic engineering material in construction because of its economy of use, good durability and easily manufactured at site. Concrete needs to be designed for various properties like workability, durability and strength. The concept of self-curing agents is to reduce the water evaporation from concrete, and hence increase the water retention capacity of the concrete compared to conventional concrete. It was found that water soluble polymers (poly ethylene glycol) can be used as self-curing agents in concrete. Proper curing is necessary to achieve desired strength and performance of concrete. In conventional concrete curing is done by after various stages like mixing, placing and finishing. Self-Curing is a technique which is used to provide proper moisture contents in concrete for better hydration for a long time.

2. OBJECTIVES

1. To minimize the quantity of water required.
2. To use shrinkage reducing admixture PEG and SAP molecules in concrete which helps in self-curing.
3. To study the mechanical characteristics of concrete such as compressive strength, split tensile strength etc.

3. METHODOLOGY

Stage-I: Required design for project grade (M30)

Stage-II: Collection of materials as per design specifications

Stage-III: Testing of materials

Stage-IV: Casting of cubes (both conventional and special type)

Stage-V: Curing of conventional concrete cubes

Stage-VI: Testing of cubes

Stage-VII: Interpretations of results and conclusions

EXPLANATION

Stage-I: Required design for project grade (M30).

Prepare a concrete mix design for M30 grade concrete as per IS 10262-2009.

From design mix proportion is as follow.

Cement	Sand	Aggregate
1	1.6	2.59

Stage-II: Collection of materials as per design specifications.

Collection of all the material as per designed quantity i.e. Cement, Sand, Aggregate and PEG (poly ethylene glycol).

Stage-III: Testing of materials: Conduct the entire test on materials i.e. consistency and initial & final setting time test on cement. Abrasion value test, impact value test, crushing value test on coarse aggregate and sieve analysis on sand.

Stage-IV: Casting of cubes (both conventional and special type).

Casting of cubes both conventional and special type using ratio of material as per design.

Stage-V: Curing of conventional concrete cubes.
Place all cubes of conventional type concrete in curing tank for 28 days for curing.

Stage-VI: Testing of cubes.
Test both types of cubes i.e. conventional and special type at 7 and 28 days respectively.

Stage-VII: Interpretations of results and conclusions.
From test result compare the both concrete on the basis of strength and economy.

4. RESULTS

7 DAYS CUBES TESTING RESULT

% OF PEG	0.25	0.5	0.75	1.0
AVG.RESULTS	18.41	20.66	22.37	21.18

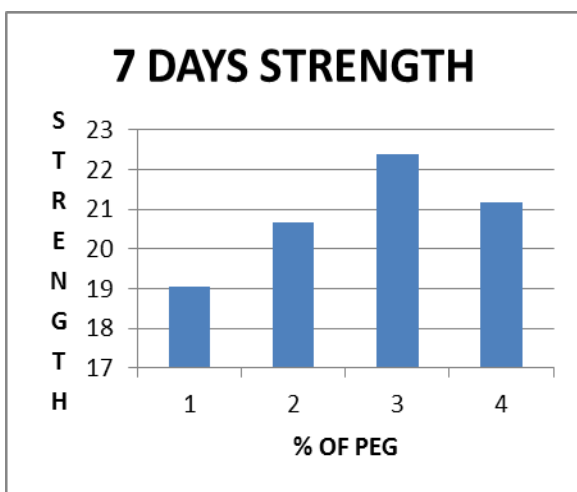


Fig.1 Graph of 7 days testing results

28 DAYS CUBES TESTING RESULT

% OF PEG	0.25	0.5	0.75	1.0
AVG.RESULTS	27.35	29.54	34.09	29.48

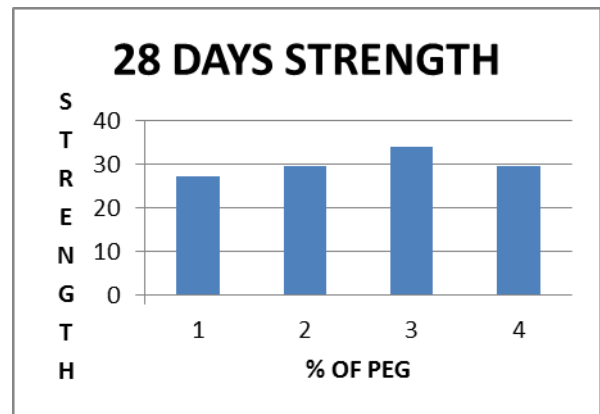


Fig.2 Graph of 28 day testing results

CONVENTIONAL CUBES TESTING RESULT

DAYS	7	28
AVG.RESULTS	19.66	35.38

5. CONCLUSIONS

From the tests conducted, it is observed that self-curing concrete does not have shrinkage as compared with conventional concrete and self-curing concrete is more economical because of it eliminate the curing charges.

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**RUKARE SURAJ SANGAPPA**

B.E. Civil Engineering,

Dr. D. Y. Patil S.O.E.T., Lohegaon,
Pune - 411047**SALUNKHE SHUBHAMKUMAR SURESH**

B.E. Civil Engineering,

Dr. D. Y. Patil S.O.E.T., Lohegaon,
Pune - 411047

BIOGRAPHIES

**TUPTEWAR SHRIPRASAD MADHAVRAO**

B.E. Civil Engineering,

Dr. D. Y. Patil S.O.E.T., Lohegaon,
Pune - 411047**UNDE RAJESHWAR HOUSHIRAM**

B.E. Civil Engineering,

Dr. D. Y. Patil S.O.E.T., Lohegaon,
Pune - 411047