Experimental Study on Strength of Concrete using Super Absorbent Polymer

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Abstract: Now a days concrete is widely used as a construction material due to its strength and durability. Concrete mix proportion is dependent upon the nature of work of cement, aggregate and water. Concrete needs proper Curing to attain the desired strength. Insufficient Curing affects the strength and durability of the concrete. For Curing the availability of water is the demand. Self Curing Concrete is one of the special concrete in mitigating insufficient Curing due to human negligence paucity of water in arid areas. In this study the attempt is made to study the various mechanical properties of concrete under self curing. It can be accomplished by mixing Super Absorbent Polymer in concrete in various proportion such as 0.1\% to 0.5 \%. Super Absorbent Polymer absorbs water and stores it within its molecular structure and supplies required amount of water for Curing which prevents shrinkage.

Keywords: Concrete, Self-Curing, High Strength, High Durability, Super Absorbent Polymer.

I. INTRODUCTION

Normally curing is given to promote the hydration of cement and control of temperature and also moisture moment into the concrete. Curing allows continuous hydration of cement and continuously gains its strength, once curing stops concrete gaining stops also stops. Proper curing is important. Self curing is a technique use to provide additional moisture in concrete for more effective hydration of cement. Curing temperature is one of the major factor that effects the strength development rate.

II. REVIEW OF LITERATURE

(1) Studies on properties of internal-curing concrete using the polyethylene glycol, (2) Mechanical properties of self-curing concrete (SCUC), (3) The Effects of curing methods in hot weather on the properties of high-strength concretes, (4) Experimental studies on self-curing concrete.

III. OBJECTIVE

The objective of work are to analyze the strength variation between concrete casted under normal Curing and concrete casted by adding SAP. To assess the effect of minimizing the quantity of water required and use admixture PEG in concrete which helps in self Curing. To study the mechanical properties of concrete by varying the percentage of PEG by the weight of the cement.

IV. EXPERIMENTAL WORK

The experimental investigation has been perform to investigate about the strength of the self curing concrete by adding polyethylene glycol(PEG) at 0.1\% to 0.5 \% by the weight of cement. In this experiment one set of conventional cured high strength concrete and another set of self cured high strength concrete were experimented. The following sets of test were done to study the compressive and tensile strength.

V. RESULT

Result of compressive test for conventional concrete

<table>
<thead>
<tr>
<th>Grade</th>
<th>Type</th>
<th>Days</th>
<th>Sample</th>
<th>Load (KN)</th>
<th>Compressive strength (N/mm\textsuperscript{2})</th>
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Result of compressive test for 0.1\% PEG

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Result of Split tensile test for 0.5% PEG

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VI. CONCLUSION

1. The maximum compressive strength and split tensile strength was found to be at 0.5% of PEG by weight of cement.
2. If the dosage exceeds 0.5% there is a slight decrease in the strength.
3. As the percentage of PEG increases the value of slump also increases.
4. Self curing concrete is an alternate to conventional concrete in desert region and where scarcity of water is a major problem.

REFERENCES

[4] M.Pawan kumar-“Experimental Study On Self Curing Concrete
[7] M.S Shetty --“Concrete Technology”