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EFFECT OF VARIOUS ADMIXTURE ON STRENGTH OF CONCRETE

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Abstract – *Many scientists, engineers and technical representative have done vast research to improve workability, strength and durability of concrete. Many types of admixtures are used to gain the required result from the mix design i.e. to achieve the target strength. Different admixture have different uses some are water reducing, retarding, accelerating etc. Function of admixture depend on need. In this investigation we have used different PC based admixtures on M40 grade of concrete and then we conclude their behavior.*

Key Words: concrete, admixture, workability, compressive strength

1. INTRODUCTION

Concrete is a construction material made of cement, aggregate (fine and coarse), water and admixture.

Cement is chemically active material becomes reactive when mixed with water. Aggregate has no role in chemical reaction but plays important role in giving good resistance and strength to concrete. It also makes concrete durable.

In solid state concrete is like a rock whereas in plastic state it can be molded into any shape . it is very weak in tensile strength hence we use steel bars to resist tension force.

Advancement in concrete technology lead to use of admixture in concrete to gain the required strength.

Function and behavior of each admixture depend on specific requirement for which it has being developed. Some are used to reduce water content some as retarding and accelerating etc and some have simply used for ease of addition in batching process.

Admixture is now a days essential component in concrete. Advancement in this technology has played a important role. The main purpose of admixture is to reduce the W/C ratio and increase the workability of concrete. The PC base admixtures has many benefits and advantages over conventional plasticizers.

Main type of admixture used in construction of building are super plasticizers, water reducing admixture, water proofing admixture.

2. LITERATURE REVIEW

"The European Guidelines for Self Compacting Concrete" define SCC and many of the technical terms used to describe its properties and use. They also provide information on standards related to testing and to associated constituent materials used in the production of SCC .Research scholars all over the globe have reported the need of admixtures in SCC .[1]

Ouchi et al (1997)have investigated the effect of super-plasticizer on the balance between flow-ability and viscosity of mortar in SCC.[2]

Mahmud et al. deduced that high-strength concrete (HSC) with a compressive strength of 80 MPa can be produced by the combined utilization of RHA and super plasticizer from the concrete age of 14 days onwards.[3]

Nehdi et al. concluded that depending on the rate of addition, RHA enhanced the compressive strength of concrete by up to 40% at 56 days .[4]

Ganesan et al. found that blended cement containing up to 30% RHA can be produced without adversely affecting the strength and permeability properties of concrete. Addition of RHA into concrete also causes significant enhancement to the durability properties of concrete.

Bouzouba and Fournier reported that the replacement of 7.5% to 12.5% of Portland cement with RHA significantly improved the resistance of the concrete to chloride-ion penetrability. At a higher proportion of replacement, it was reported that substitution of cement with up to 30% RHA resulted in enhanced strength and corrosion resistance, as well as a reduction in the chloride penetration and permeability of concrete. Rice husk ash (RHA)has been used as a highly reactive pozzolanic material to improve the microstructure of the interfacial transition zone between the cement paste and the aggregate in SCC. Research shows that the utilization of rice husk ash in SCC mix produced desired results, reduced cost, and also provided an environment friendly disposal of the otherwise agro-industry waste product.[5]

The major factors in layout planning were: cost, constructability, safety, quality, and characteristics of the building and therefore the site. BIM (Building Information Modelling) to provide more precise information about the shape, dimensions, and the structure of the buildings that can be found on the existing 2D-based drawings. [2]

3. MATERIALS

Concrete is made of cement , aggregate , water and some admixtures are added according to the function it is needed for. So we here are investigating on self compacting concrete of M40 grade.

Ordinary Portland Cement
The OPC cement is used world wide. It is made up of powder by mixing limestone and other raw materials which consist of argillaceous, calcareous and gypsum. It is preferred where construction work is to be done fast.

Aggregate
It occupies about three quarters of concrete. Two types of aggregate are usually used fine and coarse aggregate. Various test on aggregate are done and then aggregate are selected for the construction purpose. Aggregate must be always free from dust as it may not make proper bonding between aggregate and cemnt as it will act as barrier in between them.

Water
It is important to make sure that continous hydration takes place. Water only makes cement chemically active. Water must be free from reactive element. Throughout the experiment until the curing process tap water as used.

Admixture
Admixture used for this experiment are CHRYSO (Delta G8363 P), BASF (ASTP 123), THERMAX (Nutrol 225) and RAZON (SPRMC PC 961 V).We used the above mentioned admixture in the M 40 grade of concrete which is self compacting.

4. MEHOD OF DESIGN AND PROCEDURE OF EXPERIMENT

We design the mix proportion of M 40 grade of concrete using Indian standards. We used the IS code SP: 23-1982, IS: 10262-1982 and IS: 456-2000.

Basically design of concrete mix require the amount of cement, coarse and fine aggregate, water and admixture require to achieve the target strength.

We designed the M40 grade of self compacting concrete keeping same dosage of admixture. We completed this in two phases.

Phase 1 consist of initial preparation of mix design, selection oof admixtures and selection of materials.

Phase 2 consist of initial preparation of concrete mix, making of trail mix, placing of concrete in cube, curing and testing.

5. RESULT

Results of trial mix on M40 self compacting concrete

Admixture used	Compressive strength in MPa			
	3days	7days	14days	28days
CHRYSO	32.74MPa	40.26MPa	45.6Mpa	50MPa
BASF	28.16MPa	39.7MPa	43Mpa	47MPa
THERMAX	29.48MPa	40.61MPa	44 MPa	46MPa
RAZON	29.62MPa	37MPa	40.2MPa	42MPa

6. CONCLUSION

1. Every admixture used here gives the target strength required.
2. Admixture CHRYSO has given the maximum compressive strength after 28 days.

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