Effect of Various Curing Methods, Water Quality and Coarse Aggregate Type on the Strength Parameter of Concrete

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Abstract—Above all the properties of concrete compressive strength is the most important and impacting causing property on the quality and service of concrete, which makes the research on this parameter too required. Here the variation of the compressive strength of concrete on some specific parameters have been justified by an experimental work. First parameter is curing method comprising of Traditional curing method (fully immersed in water) and accelerated curing methods (warm water method) according to the Indian standard code is 9013:1978 Accompanied by second parameter of different classes of water that is taking two samples of water, one from sewage treated water with natural processes and other from institute portable tap water. And with the respective third parameter of coarse aggregate partial and fully replacement by different coarse aggregate which is crushed quartzite having enhanced crushing properties mainly used as a blast in railways. On these three concluded parameters a comparative study has been done by an experimental work in this research. For moulding and casting of concrete IS 516:1959 has been used and for accelerated curing method as per 9013:1978 only one method is used that is accelerated curing by warm water method and for this method curing tank is constructed from a material of suitable strength that will resist the effect of corrosion and such a high temperature for a long period. The internal dimensions of the tank has been adequate to accommodate the required number and size of the test specimen such that test specimen easily removed. For determining the setting time of concrete penetration test will be done as per IS: 8142-1976 and for testing the workability of concrete, Slump cone test has been done by slump test apparatus as per IS: 7320-1974. Design mix has been done as per IS:10262-2009 by performing number of test of cement, aggregates and admixture. Different trial mixes has been performed for perfect W/C ratio and propositions for concrete. The experiment comprises of numbers of cubes which have been casted by a mould of dimension 150 mm X 150 mm X 150 mm as per IS 516:1959 and hence as per IS:456-2000 for each test sample minimum 3 cubes to be cast. So the experiment is categorized in specific classes and required number of cubes has been prepared and then allow for monitoring compressive strength at 7, 14, 21 and 28 days for each parameter test samples. The test result has been compared to follow up the correlation curve between the result from compressive strength test on specimen cured by normal curing method and accelerated curing method for tap water and sewage treated water with partial and fully replaced coarse aggregate by crushed quartzite stone.

Key words: Accelerated curing method, Design mixing, specific gravity, Warm water method, Specimen sampling

I. BRIEF LITERATURE REVIEW

Many national and international journals and papers were published on the study of compressive strength of fresh and hardened concrete and effect of various water quality on the properties of concrete and curing methods, but still during construction work of concrete and its mixing quality of aggregates and cement is concerned but water quality is not tested and is use directly which may lead to failure of structures and many reports have been seen on this weak region.

A. Ulku Sultan Yilmaz And Hakan Turken-

Selcuk university, Engineering and architecture faculty, department of civil engineering, turkey published journal on effect of various curing materials on the compressive strength characteristics of the concrete produced with multiple chemical admixture. Effect of chemical compounds in water setting times, workability and strength of high-performance-concrete– researched by ARUNAKANTHI at Jawaharlal Nehru Technological University, Anantapuram.

Effect of water quality on the strength and durability characteristics of blended cement concrete silica fume concrete and fiber reinforced concrete – researched by Reddy, Balam madhusudhana (Jawaharlal Nehru technology university, anantapuram)

In all these types of journals they have commonly discussed and experimented the effect on compressive strength of concrete under different types of admixtures and curing methods and water quality.

II. NEED OF THE PROJECT

As concrete binds every new construction and from its discovery concrete changed the world’s construction system and speed up to the mark, so to experiment the new way of concrete construction and in its properties in such aspect by definite mode, hence the concrete strength and durability can be enhanced and compared to use particular concrete in particular project with more perfection and with more efficiency.

III. METHODOLOGY

Number of Samples of different concrete such as some SPECIAL CONCRETE are developed mixing with different water quality and the mixing of concrete is as per new codes IS 10262:2009 and with IS 456:2000 also and the different methods of curing as per IS 9013:1978 and compressive strength is calculated for number of samples, so that it can be determined which concrete is liable with which water quality and curing method and partial and fully replacement of coarse aggregate.

IV. OUTCOMES

Estimated increase or variation in compressive strength of concretes on comparative parameters of curing methods,
water quality and coarse aggregate replacement has been recorded in the form of graph plotting.

REFERENCES


