

Investigation of Reactive Powder Concrete For Durability on Different Curing Conditions

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Abstract- In this day Concrete is commonly usable material for development of structure and some certain limitations become complex also. So it has seen that Reactive Powder Concrete has a good durable and high compressive strength. After development of technology it gets more effective in modern days. The Reactive Powder Concrete (RPC) has compressive strength up to 230 Mpa, which is 4 times greater than the normal concrete. It is ultra high-strength ductile cementitious material. In important parameter of civil construction concrete the main key factor of concrete is cement. The carbon dioxide can be affected environmental surrounding and human health. Production and manufacture of one tone cement to one tone carbon dioxide. It is deleterious problem created to surrounding. Now the world can be focusing on ecofriendly product and material. It cannot be harmful for human health or atmospheric conditions. It can be added ,5% 10%, silica fume and 2%, 3% steel fiber can also be added.

Keywords- Quartz Sand, Sand, Silica fume, Steel Fibers, Catalyst Activator, Compressive Strength, flexural strength, Curing Temperature and time.

I. INTRODUCTION

Basically Reactive Powder Concrete has a composed cementitious matrix material. It also improves physical properties and advance mechanical properties which are developed the ultra-high performing concrete. It is the light weight concrete so dead load of structure can be reduces applying the Reactive Powder Concrete. It is composed very fine powder materials cement (OPC), silica sand (Quartz crushed sand), silica fumes (SF) and super plasticizers. Reactive Powder Concrete is not a concrete, it is a homogenous mix without coarse aggregate which is used in concrete this is a part of grout of ultra high-strength compressive material, So it can be used for structure and non structure components or for repairing work of structure can be used. Addition of silica fumes to the concrete mix which can be improving the durability through permeability that can be reduction of concrete. And also improve the ability of silica fumes concrete that is protecting the corrosion of the embedded steel. Disadvantage: Quartz sand have surface

roughness and higher absorption rate due to higher surface area causes decrease in workability.

The general idea Reactive Powder Concrete (RPC) has a low water/ binder ratio and to add enough water so that the chemical hydration reaction can be occurs, but not more than the necessary to saturate the reaction. It is define RPC is generate economic benefits and a high compressive strength and good durability that the structure are strong and not sensitive for environment. Compressive strength and flexural strength of concrete can be found out. Also it is ecofriendly in temperature effects not create a thermal expansion on RPC. It has seen that the Flexural strength is approximately 10 times that of the normal concrete, RPC has a low self weight of the structure was maintained. In the Reactive Powder Concrete (RPC), Silica fumes has a recognized as a pozzolanic admixture that is effective in mechanical properties, By using silica fumes along superplasticizers that could be observe easier relatively compressive strength. In this research, an effort has made to understand the properties of Reactive powder concrete and Silica fume, Steel fibers, superplasticizers Focus is on mixing design and curing type and temperature. This project has included testing of materials, and prepares the model moulds for different mix propositions and different curing conditions, to find out the strength of RPC concrete blocks such as Tensile strength, NDT, Compression strength, result, discussion and conclusion.

II. LITERATURE REVIEW

Arnaud Poitou et. al (2001) It is found that the selection of ingredient which is occur the positively curing regime and it is totally effected in the major role of the enhanced performs the ultra high-strength concrete which is made up more reactivates of achieved high chemical properties and physical properties of the Reactive Powder Concrete (RPC), it could be contain the mix proportion has been developed the behavior of the concrete which is not effected the structural and non-structure component. And the experimental results that could not effected as.

D.D.L Chung et. al (2005) In such an assessment carbon and short fibers can be used in cementitious mortar or cementitious paste that could be percolating threshold of the molded concrete. In this mixing the ratios of concrete is good durable and contain the high-strength proportions and the degree of dispersion can be improve in the silica fume and short steel fibers that could be obtained the positive results of the admixture. Latex particles dispersion is less effective than acrylic particles.

Konstantin G.Sobolev et. al (2007) The concept of highly modification of multicomponent binder. This is containing a low water/binder ratio and the supplementary cementations materials like silica fumes, steel fiber, superplasticizer which is made up highly potential ingredient materials. The observation of effect Polyethylhydrosiloxane admixtures may contains the freezing and thawing conditions, and the investigation of passivation of steel reinforcement. It indicates uses of superplasticize Polyethylhydrosiloxane required the air void spacing factor which is made up of admixture respectively.

Annamaria Gisario et.al (2011) Studied several particles attention for focused to drilling the hole which is manipulated to the basis of digital image processing of the Reactive Powder Concrete and after the drilling the hole it can be fill the RPC granual materials like silica fume, Natural sand ,Quartz sand with cement. It contains the modification of the drilling hole and measured the accurate compressive and flexural strength of the Reactive Powder Concrete to be maintaining the structure.

Jin Sheng Wang et.al (2015) Researcher an innovated slab type, and which can made an alternative Reactive Powder Concrete (RPC) material can be designed a frame structure type. In this investigation the different cross section profile which can make for parametrically and compare proposed demonstrated RPC slabs requirement for good stiffness and strength of the normal concrete plane slab. The temperature warping deformation can made for RPC frame slab were decreased as much as by 41.7% to 37.0% respectively. Which is stimulated temperature gradient and temperature effects that could be within the strength capacity of corresponding RPC material.

Wen- Hao Pan et. al (2016) The effect of curing condition that occurs in the composite deck and it is relevant which offer the post cracking behavior of the Reactive-Powder Concrete layer. and it can be improve the mixing ingredient of the concrete i.e. used steel fibers also to study the mechanical properties of concrete in a wet joint which is possible to the load combination of nominal RPC tensile strength that could

be occur the maximum cracks in the structure. There are additional material silica fume can be added and to remove the wet joint cracks and it is stimulated the formation of the Reactive Powder Concrete (RPC).

Ahmet B. Kizilkanat et.al (2016) In this cement mortars mixture can be replacing the 15, 25, and 35 % of Portland cement with Pumic Powder and Fly Ash-Blended. Which is effectively results can be occurs highly compressive strength developed and it is economical for the structure used which is ecofriendly in environmental conditions and various temperature effects and also consumption of the Portland cement. it is highly permissible ions contains in the replacing of the Portland cement with Pumic Powder and Fly Ash.

Jonathon Backus et.al (2016) In the GGBS concrete that would be increase the corrosion of concrete reinforced steel. It is an important factor as responsible for active corrosion. It is highly soluble of penetrating chloride and carbon dioxide which is in acid form and may contain the phenolphthalein indicator. And the result indicates the binding capacity of admixture concrete, concentrated of free chloride ion must be soluble increasing the effect of carbonation.

R.T. Way et.al (2016) The researcher carried out chemical degradation on the particles in a drying period and slow heating rate. This is caused due to the effect of by compressing water in the mixture of the matrixes. That is possible isolation of excessive pore pressure which may contains subsequently in the water evaporation, the performance of ultra high-induced chemical degradation of critical areas. This is highly compressive strength up to 230 Mpa in the concentrated fiber-reinforced concrete. And the two different curing conditions that could be made up, water curing 250C and steam curing 800C to 90% relative humidity.

I.M.Nikbin et. al (2016) In this paper the researchers can be found that the SEM is affected in filler contains decrease slightly. (From 19.0 to 15 mm for a water/cement ration of 0.47 to 0.6%).and it indicates the brittle behavior of ductile material which is slightly decrease the filler contents.

Rita Esposito et.al (2016) The deteriorating impact only in terms of concrete swelling but also to induced mechanical degradation is also consideration. In this process the concrete expansion and various engineering parameter can be developed structural parameters which are the key parameter are investigated. Under the concrete free-expansion are collected and statistically analyzed.

Husam H. Hussein et.al (2016) This paper carried out the superior strength and durability which can be helping the reactive powder concrete. It can be finding out reduce joint

cracking and impair transfer transverse load. Which is finding out the failure was obtained at the maximum tensile stress

III. DISCUSSION

Studied above research paper Reactive powder concrete is made of Quartz sand, Sand, Silica fume, Steel fibers, Catalyst Activator. The material properties can react each other and the chemical Process starts. So, it can be directly affected by the strength of material. The different curing temperature conditions are more effective and workable for all atmospheric conditions. By using different molarities of chemical to check the variation of the strength of content. To get increasing the viscosity and reducing the workability of concrete, due to changing variation of contents.

IV. CONCLUSION

Based on above papers Reactive powder concrete having good compressive strength instead of Cement concrete cement. The temperature is also the main parameter Reactive powder concrete. Reactive powder concrete is fire resistance material and eco-friendly product. In the Reactive powder concrete, silica fumes, Steel fibers and catalyst Polymer are playing the vital role instead of cement material. It can be easily available and economical also. Due to increase the material particles which can be reducing the workability and increase in the strength of concrete. RPC is more homogeneous, well bonded to Quartz sand; corrosion based improved crack resistance, long term durability.

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