ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 9, Issue, 4(F), pp. 25912-25914, April, 2018

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

Research Article

TO STUDY THE STRENGTH PROPERTIES OF GLASS FIBRE REINFORCED CONCRETE BY PARTIAL REPLACEMENT OF DISMANTLED CONCRETE WASTE WITH COARSE AGGREGATE

Mohd Aadil and Mohd Bilal Khan

Department of Civil Engineering, Integral University, Lucknow (U.P), India

DOI: http://dx.doi.org/10.24327/ijrsr.2018.0904.1955

ARTICLE INFO

Article History:

Received 15th January, 2018
Received in revised form 25th February, 2018
Accepted 28th March, 2018
Published online 28th April, 2018

Key Words:

Glass fibre, dismantled concrete, compressive strength, split tensile strength

ABSTRACT

In recent year dismantle concrete waste handling with and administration is the new essential testing issue looked by the nations all finished world. It is extremely testing and environmental issue that must be handled is an indigenous way, it is alluring to totally reuse demolished concrete with a specific end goal to secure characteristic assets and decrease in new construction cost. In this test ponder is done to examine the practicality and reusing of destroyed waste concrete for new construction. The present examination to by concentrated on reusing obliterated waste material keeping in mind the end goal to lessen development cost and settling lodging issues looked by the low wage groups of the world. The squashed decimated solid waste concrete is serrated by sieving to get required sizes of total; a few tests were directed to decide the total properties previously reusing it into new concrete. The compressive strength test results of partial replacement of full recycled aggregate concrete and adding glass fibre are found to be higher than the compressive strength of normal concrete with new aggregate.

This study is a part of compressive program wherein trial examinations have been done to the impact of incomplete substitution of coarse aggregate by decimated concrete on workability and compressive strength of recycled concrete for the study at 7 days and 28 days. The compressive strength thus, observed was compared with strength of conventional concrete

INTRODUCTION

Glass fibre reinforced concrete

GFRC is a type of fibre-reinforced concrete. Glass fibre concretes are mainly used in exterior building façade panels and as architectural precast concrete. Somewhat similar materials are fibre cement siding and cement boards. GFRC has advantage of being light weight and thereby reducing the overall cost of construction there by bringing economy in construction. GFRC is concrete that uses glass fibres for reinforcement instead of steel.

Glass fibre-reinforced concrete consists of high-strength, alkali-resistant glass fibre embedded in a concrete matrix. In this form, both fibres and matrix retain their visible and chemical identities, while offering a synergistic combination of properties that cannot be achieved with either of the components acting alone. In general, fibres are the principal load-carrying members, while the surrounding ingredient keeps them in the desired locations and orientation, acting as a load transfer medium between the fibre and protecting them from environmental damage. The fibre provide reinforcement for the matrix and other useful functions in fibre-reinforced components materials. Glass fibre can be incorporated into a matrix either in continuous or discontinuous (chopped) lengths. Other valuable capacities in fibre strength composite materials. Glass fibre can be joined into a lattice either in persistent or irregular (hacked) lengths.

Dismantled Concrete Waste

Increased concern for environmental protection and for promotion of the principles of sustainable development has led some governments to introduce legislation to encourage the use of recycled aggregates. It has been built up that materials and segments recouped from destroyed structures are being reused for new development fills in and also new construction works as well as renovation projects, In the process of the practical reutilization to recycle waste concrete requires further breaking and crushing of demolished concrete. Generally reutilization to reuse squander concrete requires additionally breaking and squashing of decimated concrete. By and large, two average evaluations of pulverized solid totals can be delivered and grouped by measure degree. One is coarse reused solid totals,

Corresponding author:* **Mohd Aadil
Department of Civil Engineering, Integral University, Lucknow (U.P), India

some portion of which can be utilized as a part of new concrete or street base materials. Other is fine reused solid totals or reused mortar from squashed solid waste whose sizes are littler than 5 mm. Albeit almost no crushed cement is at present reused in the India

Aggregate

Aggregate are the important constituents in concrete. They give body to the concrete, reduce shrinkage and effect economy. Earlier, aggregates were considered as chemically inert materials but now it has been recognised that some of the aggregates are chemically active and also that certain aggregates exhibit chemical bond at the interface of aggregate and paste. The mere fact that the aggregates occupy 70-80% of the volume of concrete, their impact on various characteristics and properties of concrete is undoubtedly considerable. To know more about the concrete it is very essential that one should know more about the aggregates which constitute major volume in concrete.

Fine aggregates- When the aggregate is sieved through 4.75mm sieve, the aggregate passed through it called as fine aggregate. Natural sand is generally used as fine aggregate, silt and clay are also come under this category. The soft deposit consisting of sand, silt and clay is termed as loam. The purpose of the fine aggregate is to fill the voids in the coarse aggregate and to act as a workability agent.

Coarse aggregates- When the aggregate is sieved through 4.75mm sieve, the aggregate retained is called coarse aggregate. Gravel, cobble and boulders come under this category. The maximum size aggregate used may be dependent upon some conditions. In general, 40mm size aggregate used for normal strengths and 20mm size is used for high strength concrete.

LITERATURE REVIEW

Jin Tao, Yong Yuan and Luc Taewe(2010) in their studies on the compressive strength of SCC during High temperature exposure founded that for the temperature ranging from room temperature to 800 degree c the hot compressive strength of SCC decrease with increase in temperature compared with normal strength SCC and the high strength SCC possess a large compressive strength exposed to high temperature. They also found that addition of polypropylene fiber decreased the strength and probability of explosive spalling.

Siong_kang lim tung chai Ling Mohd Warid Hussin(2010) in their study on the strength properties of SCC With GGBFS found out that there was a systematic decrease in compressive strength whit the increase in GGBFS content during the early age. However beyond 28 days and up to 9 months, the presence of 30% to 50% GGBFS in SCC exceed the strength of the control mix because of its pozzolanic reactivity. They also found out that noticeable reduction in compressive strength was observed at the content of GGBFS reaches 60%.

Md. Nor Atan, Hanizan Awang(2011) in their studies on the compressive and flexural strengths of SCC using Raw rice husk ask founded that the raw rice husk ash can be used to replace cement in SCC. There experimented with 15% replacement of O.P.C with RRHA 305 replacement with two minerals additive components (L.P/RRHA) and 45% replacement with three minerals addictive components (L.P/S RRHA) produce complete compressive strength as the control mix and improved flexure as compared to its performance in compression.

A.AMaghsoudi, Sh.Mohamadpour, M.Maghsoudi(2011) worked on the mix design and mechanical properties of self compacting light weight concrete and found that by the use of leca (light expand clay aggregate) as light weight aggregate and 400 and 500 kg/m3 of cement containment, it was possible to produce a self compacting light concrete mix with compressive strength of 20.8 and 28.5 MPA at 28 day respectively.

N.R. Gaywala, D.B. Raijiwala(2011) in their studies on SCC with fly ash replacement of cement founded that SCC gives good finishing as compared to ordinary concrete without any external means of compactiom and the maximum compressive strength for SCC be obtained by addition of 15% of fly ash mix as compared to addition of 25%, 30%, 45%, and 55% cement replacement by fly ash and the flexural strength for SCC can be obtained by addition of 15%.

Prof. Kishor S. Sable, Prof. Madhurik. Rathi(2012) in their studies on comparison of NCC and SCC is shear and torsion founded that the strength of SCC is higher than NCC because of addition of super plasticizer in SCC to maintain flow ability gives proper compaction of a concrete which enhance all properties of SCC and the addition of fly ash in SCC improves micro structure of concrete that also helpful enhancing the mechanical properties with the durability of concrete.

Slamet Widodo(2012) in his study on fresh and hardened properties of polypropylene fibre added self consolidation concrete found that in the fresh state of SCC, when the presence of polypropylene fibre increased it caused lower flow ability (Slump Flow) and passing ability (J-Ring) of SCC mixes. On the other hand, the viscosity and the segregation of the mixes increases in accordance with the volume fraction of polypropylene fibres content.

P. Ramanathan I.Baskar, P. Muthupriy, R. Venkata subramani(2013) in their studies on the performance of SCC containing different mineral admixtures founded that by the replacement of mineral admixtures by 30 %, 40% for Portland cement optimum dosage of super plasticizer necessary to achieve a given fluidity is reduced and cost effective SCC can be obtained Portland cement with mineral admixtures.

Deepa Bala Krishna S, Paulose K.C(2013) in their studies on the workability and strength characteristics of SCC containing fly ash and dolomite powder founded that the use of fly ash in SCC mixes reduces the possibility of bleeding and segregation and increases the filling and passing ability of concrete, where dolomite powder imparts viscosity to the concrete and improves the segregation resistance of the concrete mix.

Sumrerng Rukzon and Prinya Chindaprasirt(2014) in their work on use of Rice Husk Bark Ash in producing SCC founded that GHRBA containing fine irregular shaped particle increase the amount of super plasticizer required and the incorporation of 30% of GRHBA decreases the corrosion, chloride penetration of SCC.

CONCLUSION

1. From various study it is clear that dismantled concrete can be used as a resource aggregate.
2. It will be promoted as sustainable growth**.**
3. it will be reduce burden on natural aggregate eventually help in conserving natural resource.
4. Replacement of used dismantled concrete as coarse aggregate and glass fibre in concrete, the split and compressive strength will be increases up to 60 % as compare to normal concrete test result.
5. The percentage of replacement of dismantled concrete was increase from 0% to 60% compressive and tensile strength was increase from 30% as compared as normal concrete test result.
6. After performing 14 cycles of wetting drying test on all the mixes, a common trend of increased compressive and split tensile strength is observed in all the demolished coarse aggregate based woven rowing glass fibre mixes.

In this paper we made an attempt to study the properties of dismantled concrete with partial replacement of fly ash with cement. The maximum compressive strength value for 7 days is obtained when 10% cement replaced with fly ash along with 0.3% glass fibre. Compressive Strength increases with increase of glass fibre. And with increase of fly ash Compressive Strength decreases. However10% replacement of cement with fly ash along with 0.1%, 0.2% & 0.3% glass fibre showed increase in the compressive strength by increase fibre percentage. The maximum split tensile strength value for 7 days is obtained when 10% cement replaced with fly ash along with 0.3% glass fibre. Due to addition of glass fibre split tensile strength increased and is optimum when. 20% cement replaced with fly ash along with 0.1%, 0.2% glass fibre. Addition of glass fibre decreases the workability of concrete

References

1. Jin Tao, Yong Yuan and Luc Taewe, "compressive strength of SCC during high temperature exposure," *J Mater, civil Engg*, vol.22, no 10, pp.1005-1011, may. 2010
2. Siong_kang Lim, Tung_chai, Mohd. Warid Hussin, "strength performance of self_compacting Mortat mixed with GGBFS," *Journal of construction materials,* Volume165, issue 2, p 87-98.
3. Md Noratan, Hanizam, "compressive and flexural strengths of self compacting concrete using Raw rice Husk ash," *Journal of Engineering Science and Technolog*, vol.6, no6, April 2011 p 720-732.
4. A.AMaghsoudi, Sh.Mohamadpour, M.Maghsoudi "mix design and mechanical properties of self compacting light weight concrete," *International Journal of Civil Engineering,* Vol. 9, No. 3, September 2011
5. N.R Gaywala, D.B Rajiwala, "self compacting concrete: A concrete of next decade," *JERS*, Vol II/Issue IV/October-December 2011 ,p 213-218.
6. Prof. Kishor S. Sable, Prof.Madhurik.Rathi, "comparison of normal compacting concrete and self compacting is shear & torsion," *IJCTEE* Vol.2, Issue4, August 2012.
7. Slamet Widodo, "Fresh and Hardened properties of polypropylene fiber added self consolidation concrete," *International Journal of civil and Structural Engineering* Volume 3 issue 1 2012.
8. P.Ramanathan,I.Bhaskar, PMuthupriy, R.Venkata subramani, "performance of self compacting concrete containing different mineral admixtures," *KSCE Journal of civil Engineering,* March 2013, Volume 17, Issue 2, p 465-472.
9. Deepa Bala Krishnan S, Paulose K.C, "Workability and strength characteristics of self compacting concrete containing flyash and dolomite powder," *American Journal of Engineering Research,* Volume -2, p 43-47.
10. Sumrerng Rukzon and Prinya Chindaprasirt," Use of Rice Husk-Bark ash in producing self compacting concrete , "Hindawi Publishing Corporation Advances in civil Engineering vol, 2014, articleid.429727.in Tao, Yong Yuan and Luc Taewe, "compressive strength of self compacting during high temperature Exposure ,"*journal of materials in civil engineering*, vol.22 no 10,October 2010,p 1005-1011.

How to cite this article:

Mohd Aadil and Mohd Bilal Khan.2018, To Study the Strength Properties of Glass Fibre Reinforced Concrete by Partial Replacement of Dismantled Concrete Waste with Coarse Aggregate. *Int J Recent Sci Res.* 9(4), pp. 25912-25914.
DOI: http://dx.doi.org/10.24327/ijrsr.2018.0904.1955

****