International Journal of Research
Available at https://edupediapublications.org/journals
e-ISSN: 2348-6848
p-ISSN: 2348-795X
Volume 05 Issue 01
January 2018

New Construction Waste Utilization of Demolished Concrete

[1]SIKHA BABU, [2]K.SAI BABU.
[1]M.tech-Scholar, Dept of Civil engineering, Chintalapudi Engineering College, Ponnur, Guntur DT.
[2]Assistant Professor, Dept of Civil engineering, Chintalapudi Engineering College, Ponnur, Guntur DT.

Abstract: In this paper we are going to discuss about the utilization of demolished concrete waste for new construction. Basically, in modern years all the countries in the world are facing with a single problem that is to handle the demolished concrete waste and its management. In order to protect the natural resources and to reduce the environmental pollution we should recycle the demolished concrete waste in an inherent manner. Now the main intent is to focus on recycling the demolished waste material. Because of this process there will be reduction in construction cost and this process will analyse the housing problems that are faced by low communities in the world. Before the process of recycling, various tests are handled to determine the aggregate properties. To access the required size of aggregate, the enfolded demolished concrete waste is separated by the process of clarification. So from this we can say that the recycled concrete aggregatesare obtained from the site of good quality concrete. Here the compressive strength test result of recycled aggregate concrete is higher than the compressive strength of normal concrete.

Key words: concrete waste, demolished, recycle, new concrete, fresh coarse aggregate

I.INTRODUCTION

Promotions to legislation. Themain intent is to not only protect the environment but also to reduce the cost of construction. As we know that to develop the countries large Quantities of construction materials are required and after construction the demolition wastes are generated by these countries. Now this is one of the major issues and this wastage will occupies huge space for disposal which pollutes the environment. Here the both demolition sites and restoration schemes are the sources of solid waste. So here a modern method is used to prevent the environmental pollution by reducing the stocks of waste and by decreasing the use of natural aggregates. But here reusing the building waste is a new issue generated in the world. In some cases buildings get destroyed due to disasters and generally fragmented building components, furnishings and organic matter are difficult to separate from rubble. But the demolition waste is crushed, proceded and reused as aggregate in building works. Waste is nothing but it contains half used paint pots, discarded solutions, solvents and chemicals which are treated as dangerous to use.

Now for new construction works materials and components are reused from demolished buildings. Materials used in construction are cement, fine aggregates, course aggregates and water. Here cement is a substance which

binds the other components together and an ordinary portland cement is used in construction. Coming to the fine aggregates these are the natural sand, crushed stone sand and crushed gravel sand. The results of these aggregates are depends upon thier stream. The fine aggregates passes from the 4.75 mm IS sieve. Next one is course aggregates, this one is retained on 4.75 mm IS sieve and contains only finer material. In this uncrushed and crushed gravel stone will be there as aggregates. Last one is water which used for the purpose of casting and curing of specimen. The faster development of industries in the world will cause depletion of natural aggregates and produces large amount of waste material from the construction sites. So to overcome thgis problem there is only one method that is to utilize the recycled aggregate in the new consrtuction concrete components.

II. LITERATURE SURVEY

Generally, the stae of art reports says that about 50-60 million tons of concrete is demolished every year in European countries. This demolished concrete is recycled in the country but it was not used in the high way construction. So to overcome this problem the reaserchers starts thinking about the reusing of demolished concrete for production. So reusing the demolished concrete will consume the resources and promote the safe use of concrete in an economic way. At last the reaserch result also shows the positive result of reusing the demolished concrete. They provide some limitations and giude lines for reusing the demolished concrete. Now let us discuss about the techniques whic are used in the process of reusing.

III. EXPERIMENTAL TECHNIQUES

The main intent of these techniques is to recycle the aggregate in new construction concrete components. Here the concrete watse is appropriated fom the demolished site. So this demolished waste is transported, crushed and sepaerated. Many tests have been conducted in the laboratory like water absorption, sieve analysis, crushing value test, impact value test and abrasion test. Basically, the strength of natural and demolished waste is obtained by making cubes.

To get fitness of aggregate a set of IS services are clarified from demolished waste. Here the practical replacement of demolished waste is used to know the effect of demolished waste and the strength of concrete. Now to compare the strength of concrete we should know the effect of practical replacement of demolished waste. For the both nominal mixes we are using some quality and required qunatity of cement and fine aggregates. The compressive strngth of cubes will obtaines after seven days. For the both nominal mixes, the ordinary portland cement is used. Here locally available coarse sand is used as fine aggregates and in the same way locally available crushed stone aggregate is used for size. Now let us discuss each techniue in detail manner.

1. Water absorption

The below table (1) shows the result of absorption capacities of water at different percentages. From this we can observe that the recyled aggregate will give higher water absorption than the conventional concretes. At last we can conclude that the water

absorption of coarse recycled aggregate is higher than the water absorption of orginal aggregates. Because of the higher absorption in water, the old mortar is attached to the original aggregate particles. The water absorption capacity is increased because of water penetrate into the accessible pores.

S. No.	Material	Observed value (%)
1.	0% Recycled Aggregate	1.50
2.	25% Recycled Aggregate	2.05
3.	50% Recycled Aggregate	2.87
4.	75% Recycled Aggregate	3.40
5.	100% Recycled Aggregate	4.60

TABLE. 1. WATER ABSORPTION OF DIFFERENT PERCENTAGE OF RECYCLED & FRESH

2. Sieve Analysis Test of Aggregates

From this analysis we can determine the practical size distribution of coarse and fine aggregates. By using different size of sieves the test is conducted. Each size is represented by using IS (Indian Standard) code and this one is passed through the aggregates and collects different size of particles from different sieves. The entire process can be observed from the below figure (1).

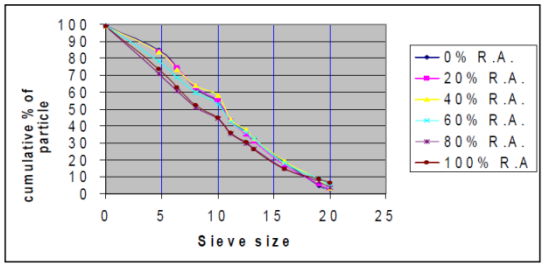

Fig. 1 Average sieve analysis test of aggregates

3. Aggregate Crushing Value Test

Depending upon the aggregates of rocks the crushing strength of stone is determined. This aggregate works under strong and weak conditions. But for road construction the aggregate should be strong enough to resist the crushing under traffic whell load. If the aggregate is in weak condition then the crushing value become unstable. This is about the crushing value test, let us discuss about the aggregate impact test.

4. Aggregate Impact Test (Toughness of Aggregate)

To resist the impact in aggregate toughness is the major property. Pounding actions are occurred due to the traffic loads which breaks the stone into smaller pieces. Impact test for road stones is nothing but resistance of stones to crack under repeated impacts. From tabel 2 we can observe that Impact value of different percentage of recycle & fresh aggregates.

S. No.	Aggregates	Impact Value (%)
1.	100% F.A.	24.67
2.	20% R.A.	31.41
3.	40% R.A.	34.74
4.	60% R.A.	36.46
5.	80% R.A.	38.74
6.	100%R.A.	41.17

TABLE. 2. IMPACT VALUE OF DIFFERENT PERCENTAGE OF RECYCLE &FRESH AGGREGATES

5. Los Angeles Abrasion Test

The last test is abrasion test; the main intent of this test is to find percentage of rubbing action between aggregates and steel balls. Here we use the aggregate as abrasion resistance.

IV. CONCLUSION

To construct sustainability one of the most important element is concrete recycling. Here the concrete is made up of cement where raw materials of cement are used after hardening. Concret consists of waste products like aggregate like green concrete. Here this paper mainly focuses on the constusction of waste aggregate to make new green concrete. Different tests are performed to make recycling process they are water absorption, sieve analysis, impact value, abrasion value, crushing value which are explained earlier in detail manner. The following conclusions are drawn on the basis of this study

1.Demolished aggregate consists of lower bulk crushing, density and impact standards and higher water absorption as compared to natural aggregate.

2. Using demolished aggregate concrete as a base material for roadways to reduce the pollution involved in trucking material.

3. From the analysis we can say that compressive strength of the concrete is decreases with increasing the percentage of demolished material.

4.The split tensile strength of demolished concrete is also decreases with increasing the percentage of demolished material.

5.The 28 days tensile strength of the concrete is decreases with increasing the percentage of demolished material.

V. REFERENCES

[1] Khalaf FM and DeVenny AlanS, *Recycling of demolished masonry rubble as coarse aggregate in Concrete review,* ASCE J Material Civil Eng (2004), pp. 331-340.

[2] Kawano H., *The state of using by-products in concrete in Japan and outline of JIS/TR on recycled concrete using recycled aggregate.*, Proceedings of the 1st FIB Congress on recycling, USA, 2003, pp. 245–53.

[3] Gilpin Robinson Jr R, Menzie DW, and Hyun H., *Recycling of construction debris as aggregate in the Mid Atlantic Region, USA.*, J. of Resource Conserve Recycle, 42(3), 2004, pp. 275-94

[4] Khater HM, *Utilization of construction and demolition wastes for the production of building units*, Master Theses, Zagazig University, Zagazig, Egypt, (2006).

[5] Poon CS, Kou SC, Lam L., *Use of recycled aggregate in molded concrete bricks and blocks***,** Construction and Building Materials, 16(5), (2002), pp. 281–289

[6] Shui Z, Xuan D, Wan H, Cao B., *Rehydration reactivity of recycled mortar from concrete waste experienced to thermal treatment*, Construction and Building Materials, 22(2008), pp. 1723–1729

[7] Works Bureau of Hong Kong, *Specifications facilitating the use of recycled aggregates*, WBTC No. 12(2002).

[8] Ryu JS, *An experimental study on the effect of recycled aggregate on concrete properties*, Mag. Concrete Res., (2002), pp. 54: 7–12.

K. SAI BABU completed his B.Tech at Chintalapudi Engineering College, Guntur and M.Tech at Nalanda institute, Sattenapalli. He has 2 years of teaching experience and at present he is working as Assistant professor at Chintalapudi Engineering College, Ponnur.

SIKHA BABU completed his B.Tech at Malineni Perumallu Education Society, Guntur and pursuing M.Tech at Chintalapudi Engineering College, Ponnur.