**REVIEW PAPER ON CHARACTERISTICS OF CONCRETE USING AGGREGATE FROM THE DEMOLISHED CONCRETE**

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***ABSTRACT***

The construction industries require large quantities of low-cost raw materials and so always provide opportunities for waste reuse.

In big and over populated cities, old and dilapidated structures are demolished for the purpose of building new and high- rise structures. As a result, considerable large volume of debris and rubbles get accumulated with a serious threat to the environment. Low lying land around the towns and cities may well be reclaimed with this waste material. But this type of usage has been changing gradually. The continuous use of natural resources and the consequent energy requirement for their processing has serious economic problems.

Moreover, in alluvial plain areas where there are no locally available supplies of natural aggregates, such debris and rubble particles may be recycled and put into use for new structural applications. Use of such neglected material will no doubt bring down the high transportation cost of new aggregates from the quarries to the construction sites.

***Keywords:-*** *dilapidated structure, demolished, transportation cost, aggregate, binding medium, coarse aggregate*

**INTRODUCTION**

Of the five chief materials comprising reinforced concrete, cement is the most important as it provides the binding medium, although cement constitutes only about 10 per cent of the volume of concrete mixture. Concrete can be considered as an artificial stone obtained by binding together the particles of relatively inert and coarse aggregate.

Concrete aggregates usually consist of naturally available gravel or crushed rock or mixture of these materials. Natural sand and gravels are the most common and are used whenever they are of satisfactory quality and can be obtained economically in sufficient quantity. River sand is undoubtedly the best as it will contain particles of varying sizes and is cheaply procurable, but the quantities found may be limited. Such a difficulty was encountered for example at the Grand Couler Dam, U.S.A., the largest dam in the world. As it could not be quarried from the river, it was quarried from the ground.

Crushed aggregates are widely used for coarse aggregate and as fine aggregate, where natural sand is not available in abundance. Although production of workable concrete from the sharp, angular, crushed fragments usually requires more care and more cement than that of concrete made with well rounded sand and gravel.

**LITERATURE REVIEW**

The first extensive and well-documented use of materials from the demolition of buildings as aggregates in fresh concrete was during and just after the Second World War. At this time the rubble left after the bombardment of cities especially after aerial bombing was used in concrete for rebuilding particularly in Britain and Germany. Later when wartime fortifications were being demolished, the rubble from these were used. Most of the literature from this time describes the use of brick rubble as this was the predominant building material. There are however at least two reports from the immediate post-war period describing the use of concrete rubble and these are described below:

Since that post- war period there has been little research until quite recently when the increasing numbers of concrete buildings being demolished and a possible future scarcity of natural aggregates in some areas has reawakened an interest in the use of concrete rubble as an aggregate. About the findings of conventional concrete, there is a lot of literature available. Hence, here the findings on concrete made with crushed concrete as coarse aggregate (recycled concrete) are quoted.

Gluzhge[1] investigated the use of waste concrete as an aggregate in Russia in 1946. He found that crushed concrete aggregate had a lower specific gravity than natural aggregates and that the concrete made with the crushed concrete aggregate had a lower compressive strength. At equal compressive strengths the flexural strength of concrete made with crushed concrete aggregate was greater than the control mixes. If concrete fines were used, the cement content had to be increased unduly.

Graf, Otto[2] studied the use of building rubble as an aggregate in Germany in 1948. He examined the effect of contamination by gypsum plaster by adding controlled amounts of gypsum to the rubble. He concluded that about 1 per cent of SO3 in the form of gypsum caused a greater expansion in a shorter time than gypsum grains of 1-7 mm. He also found that gypsum tends to concentrate in the finer material.

**Ploger[3]** recycled two concretes in two aggregates, one contained natural gravel and other trap rock coarse aggregate. His data suggested a lower compressive strength for recycled aggregates.

**Buck, A.D[4]** studied concrete mixes that contained recycled concrete as coarse aggregate as well as mixes that contained recycled concrete both as fine and coarse aggregate. He studied the compressive strengths of concrete containing recycled concrete aggregate at constant water/cement ratio (and constant workability) except for two mixes in which the W/C ratio was reduced by the use of a water reducing admixture and by the addition of fly ash. In general, he found lower strengths compared with control mix. However, he was able to show that the strength of the concrete can be higher than the original strength of the crushed concrete. Moreover, he also summarized that there is no correlation between strengths of the original concrete and the strength of the new concrete made using the former as aggregate.

**Stamatia Frondiston – Yanas[5]** studied the variation of strength with water-cement ratio of concrete made with crushed concrete coarse aggregate. The old concrete was made with a granite gravel. In general, he confirms the findings of previous authors that the concrete containing the recycled aggregate has a lower compressive strength.

He also studied the aggregate matrix bond strength for fresh granite gravel, granite gravel sorted from the crushed concrete, granite gravel with adhering mortar and of crushed mortar from the concrete. His results showed a decreasing bond strength with increasing proportion of mortar, emphasizing the desirability of reducing the proportion of mortar in recycled concrete aggregate.

Frondiston- Yanas has also measured the modulus of elasticity of concrete at different water- cement ratio made with recycled concrete coarse aggregate and natural sand fines.

**CONCLUSIONS**

Conclusion

Based on the test results of the present investigation, the following major conclusions can be drawn.

i) Recycled concrete as coarse aggregate can be used in place of natural aggregate for concrete of acceptable quality for practical uses.

ii) The concrete with recycled concrete as coarse aggregate will not impose any problem in workability in fresh state and strength development in hardened state for W/C ratio more than 0.5 for different ages.

**REFERENCES**



1. Gluzhge,P.G., "The work of Scientific Research Institutes", "Cidrotekhnicheskoye Stroitelstvo 'USSR), No. 4, April, 1946, p. 27-28 (in Russian) also brief English Summaryin Engineer's Digest, V. 7,No. 10, 1946, p. 330.
2. Graf, Otto, "Crushed-Brick Cocnrete,Sand Stone Concrete and Rubble Concrete (Uber Ziegelsplittbeton)", Die Bauwirtschaft (Wiesbaden), Jan-March 1948, Also Translation No. 73-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, January, 1973.
3. Ploger, R.R., "An Investigation of the compressive Strength of Concrete   
   in which concrete Rubble was used as Aggregate". M.S. Thesis, Cornel University, Ithaca, 1947.
4. Buck, Alan, D., "Recycled Concrete as a Source of New Concrete". ACI Journal, V. 74, No. 5, August, 1977.
5. Frodiston , Yams, "Waste concrete as Aggregate for new concrete, ACI Journal, V. 74, No. 5, August 1977. ,