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MIX DESIGN OF GREEN CONCRETE BY REPLACING COARSE AGGREGATE BY DEBRIS CONCRETE

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ABSTRACT:*Lot of construction debris are generated during the construction and demolition of any concrete structure like buildings, roads, bridges etc. and sometimes, even from catastrophes like wars and earthquakes. Discarding these wastes is a very serious problem because it requires huge space for its disposal and very little demolished waste is recycled or reused. This debris after recycling can be used as aggregates in fresh concrete in order to protect natural resources and to reduce the space required for the landfill disposal thus minimising environmental pollution. In this paper, experimental investigations have been carried out to gauge the effect of partial replacement of natural coarse aggregates (NCA) and natural fine aggregates (NFA) by recycled coarse aggregates (RCA) and recycled fine aggregates (RFA) .Further ,the results indicate that still higher replacement of the constituent materials is possible without much compromising the28 days strength and workability.*

Keywords: *Construction, demolition wastes, recycled aggregates, waste management*

I. INTRODUCTION

Huge quantities of construction and demolition wastes are generated not only in India but all over the world. These wastes are increasing every year predominantly. Construction waste recycling is gaining importance in construction industry as it protects natural resources and also reduces environmental pollution by eliminating the need to dispose them in landfills by readily using them as a source of aggregate.

It is estimated that the construction industry in India generates about 10-12 million tons of waste annually. Projections for building material requirement of the housing sector indicate a shortage of aggregates to the extent of about 55,000 million cu.m. An additional 750 million cu.m. aggregates would be required for achieving the targets of the road sector.Recycling of aggregate material from construction and demolition waste may reduce the demand and supply gap in both the sectors.The raw materials used in construction are largely naturally occurring and a non-renewable resource hence needs to be used cautiously (Yadav and Pathak, 2009). Continuous use of natural resources, like river sand has led to its shortage which is a major problem faced by the construction sector in some places in India. It is thus our duty to protect and conserve natural resources like stones, sand etc. By the reuse of demolished concrete waste in the form of recycled aggregate concrete in the

form of recycled aggregate concrete is viewed as an attempt to conserve the natural resource and preserving the environment ecologically balance.

II.OBJECTIVES

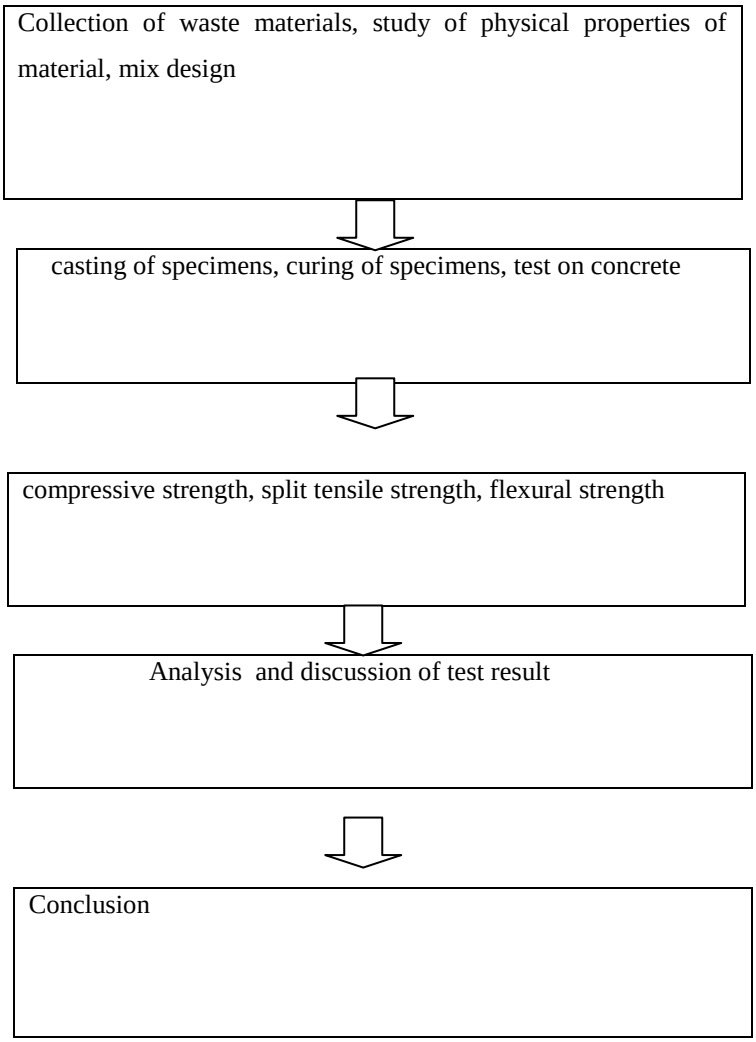
The aim of this study is to investigate the use of concrete debris by replacing coarse aggregate .brick wastes are broken into sizes ranging from 2.36 to 20 mm.

Objective 1-To determine the suitability of debris concrete waste as partial replacement of coarse aggregate.

Objective 2- To investigate the mechanical and physical properties of debris concrete waste .

Objective 3- compare the performance between concrete with debris concrete as coarse aggregate partial replacement and conventional concrete.

III.METHODOLOGY



IV.MATERIALS

CONCRETE DEBRIS

Construction and demolition debris (C&DD) means those materials resulting from the alteration, construction, destruction, rehabilitation, or repair of any manmade physical structure including houses, buildings, industrial or commercial facilities, and roadways.
C&DD includes structural and functional materials comprising the structure and surrounding site improvements. For example brick, concrete, and other masonry materials, stone etc.

V.LITERATURE REVIEW

1 .J.ACAD. INDUS RES. FEBRUARY 2013

Huge quantities of construction and demolition wastes are generated every year in developing countries like India. The disposal of this waste is a very serious problem because it requires huge space for its disposal and very little demolished waste is recycled or reused. This study is a part of comprehensive program wherein experimental investigations have been carried out to assess the effect of partial replacement of coarse aggregate by demolished waste on workability and compressive strength of recycled concrete for the study at 7 and 28 day. The compressive strength thus, observed was compared with the strength of conventional concrete. Test results showed that the compressive strength of recycled concrete up to 30% coarse aggregate replacement (C. A. R.) by demolished waste at the end of 28 day has been found to be comparable to the conventional concrete.

2. "Use of demolished concrete waste in partial replacement of coarse aggregate in concrete" SSRG International Journal of Civil Engineering (SSRGIJCE) – volume 3

In this paper, it is discussed that there is a large amount of demolished waste generated every year in India and other developing countries. Since the very small amount of this waste is recycled or reused. So, disposing of this waste is a very serious problem because it requires a large amount of space. This study is a part of comprehensive program wherein experimental investigations have been carried out to evaluate the effect of partial replacement of coarse aggregate by demolished waste on compressive strength and workability of DAC (Demolished Aggregate Concrete). For the study 3, 7 and 28 days compressive strengths were recorded. The previous study on this project shows that the compressive strength of the DAC (Demolished Aggregate Concrete) somehow resembles with the conventional concrete if used in a proper amount up to 30%. So in this study we have taken the demolished concrete aggregate 10%, 20%, 30% by weight of the conventional coarse aggregate and the concrete cubes were casted by that demolished concrete aggregate then further tests conducted such as workability , compressive strength for that DAC and the result obtained are found to be comparable with the conventional concrete.

3."Use of recycled aggregate concrete". IOSR journal of mechanical and civil engineering (IOSR-JMCE)

Use of recycled aggregate in concrete can be useful for environmental protection. Recycled aggregates are the materials for the future. The application of recycled aggregate has been started in a large number of construction projects of many European, American, Russian and Asian countries. Many countries are giving infrastructural laws relaxation for increasing the use of recycled aggregate. This paper reports the basic properties of recycled fine aggregate and recycled coarse aggregate & alsocompares these properties with natural aggregates. Basic changes in all aggregate properties are determined and their effects on concreting work are discussed at length. Similarly, the properties of recycled aggregate concrete are also determined. Basic concrete properties like compressive strength, flexural strength, workability etc. are explained here for different combinations of recycled aggregate with natural aggregate. Code guidelines of recycled aggregates concrete in various countries are stated here with their effects, on concreting work. In general, the present status of recycled aggregate in India along with its future need and its successful utilization are discussed here.

VI.CONCLUSION

1. Demolished aggregate possess relatively lower bulk crushing, density and impact standards and higher water absorption as compared to natural aggregate.
2. Workability of the concrete increases.
3. The compressive strength of demolished aggregate concrete is relatively lower than natural aggregate concrete.
4. Using demolished aggregate concrete as a base material for roadways reduce the pollution involved in trucking material.
5. Using of recycled debris concrete is very economical.

REFERENCE

[1] Lalji Prajapati, N. patel, V. V. Agarwal, "Analysis of The Strength and Durability Of The Concrete With Partially Replaced By The Ceramic Slurry Waste Powder", International Journal of Emerging Technology and Advanced Engineering, ISSN 22502459, Volume4, Issue 3, March 2014.

[2] Best Practice Guide for the use of "Recycled Aggregates in New Concrete" published by the Cement & Concrete Association of New Zealand (CCANZ) in October 2011.

[3] Parekh D. N. and Dr. Modhera C. D. "Assessment of Recycled Aggregate Concrete" publish by JERS/Vol.II/ Issue me /January- March 2011.

[4] Parekh D. N. and Dr. Modhera C. D. "Assessment of Recycled Aggregate Concrete" publish by JERS/Vol.II/ Issue me /January- March 2011.

[5] Parekh D. N. and Dr. Modhera C. D. "Assessment of Recycled Aggregate Concrete" publish by JERS/Vol.II/ Issue me /January- March 2011.