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A REVIEW PAPER ON STUDY OF STRENGTH CONCRETE CONTAINING CERAMIC WASTE AS A TILE

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Abstract : Everyday more than 30% of tiles become a waste in ceramic industry because there are cracks design. These are use in to fill the dump. Therefore environment become a polluted so in this research replace ceramic tiles as a coarse aggregate with natural aggregate.In this research replaces 0% to 50% with different portion of coarse aggregate, with different water cement ration in M20 & M25 grade of concrete.
The mix design for various kinds of mixes was created by substituting broken tiles for coarse aggregates and cement at various percentages Workability, compressive strength, this study concludes that ceramic waste could be used for both structural and non-structural works. Ceramic waste material should not be used in concrete structures where strength is the major consideration**.**

IndexTerms **– Concrete, ceramic waste,compressive strength.**

I. INTRODUCTION

One of the most important construction materials on the world is concrete. Coarse aggregate, fine aggregate, cement, water, and occasionally additives are used to make it. The necessary physical properties for the finished material may be obtained by adding additives and reinforcements to the concrete mixture. Concrete is the most extensively utilized construction material on the world due to its flexibility, durability, adaptability, and affordability. The term concrete refers to a mixture of aggregates, most often sand and gravel or crushed stone, held together by a cement paste blinder. According to the statistics, four tons of concrete are produced per person per year across the world, and 1.7 tons per person in the United States. Use of hazardous waste in concrete will lead to green environment. The concrete made so is called sustainable concrete which can also be called as Green concrete. Production of by-products and waste are increasing rapidly which need proper disposal , it's recycling and reuse is necessary for protection of environment, reduction in dependency on natural materials, reduction in CO2 and making concrete efficient and economical.

II. LITERATURE REVIEW

- **To Enhance the Strength of Concrete by Partial Replacement of Coarse Aggregate with Tile Waste (**Prof.Akshay B. Rahane, Vrushali S. Jagtap, Papiha R. Wade, Mohammad Ismail)

In this research paper to use a ceramic waste as a coarse aggregate replaced with the coarse aggregate about 25%,35% & 45%. From the experimental study on plain cement concrete and the ceramic coarse aggregate concrete, the compressive strength of concrete with the addition of tile waste increases with the increase in percentage up to 25% and it gives 23.26n/mm^2 beyond which strength to decrease with further addition of tile waste.

- **The Effect of Ceramic Waste as Coarse Aggregate on Strength Properties of Concrete (**E. E. Ikponmwosa,* and S. O. Ehikhuenmen)

This paper reports the findings on an experimental investigation of the effect of partial replacement of coarse aggregate with ceramic waste on strength properties of concrete. Compressive strength tests were conducted using 150x150x150mm cube specimens, 25%, 50% and 75% replacement of coarse aggregate.

The use of ceramic waste in concrete mix resulted in considerable reduction in the workability as replacement level increased.
The use of ceramic waste (CW) in concrete resulted in the decrease of its density but was still within the normal concrete range values. If used, this also could result in reduced dead weight of concrete structures.

The strength of ceramic waste concrete decreased due to higher flakiness value, weaker bonding of the aggregate with cement paste due to porcelain surface and higher water absorption of the ceramic waste aggregate. Hence, the substitution of coarse aggregate with ceramic waste beyond the 75% replacement level is not recommended for use in structural concrete.

- **Partial Replacement of Coarse Aggregate By Waste Ceramic Tiles** (Priyanka Kusum, Sayed Tabish Quadri)

Ceramic tiles powder may be used as a fine aggregate in the same way as ceramic tiles can be used as a partial substitute for coarse aggregate. Crushed waste ceramic tiles, as well as crushed waste ceramic tile powder, are used to substitute coarse and fine aggregates. 0 percent, 15 percent, 30 percent, 45 percent, and 50 percent of the coarse aggregates were substituted with ceramic waste broken tiles. In addition to the coarse ceramic tile. A concrete grade of M25 was developed and tested. The mix design for various kinds of mixes was created by substituting broken tiles for coarse aggregates and cement at various percentages. ‘ Workability, compressive strength, split tensile strength, and flexural strength tests for various concrete mixes with varying percentages of waste crushed after 7, 14, and 28 days curing time have been carried out. It has been discovered that when the proportion of shattered tiles replaced rises, the workability improves. The strength of concrete is increased by up to 30% when ceramic coarse tile aggregate is used.

With the addition of coarse aggregate strength of concrete is increase upto 30% replacement of coarse aggregate but strength of concrete is decrease with replacement of coarse aggregate more than 30% of replacement. Same as for split tensile strength increase upto 30% of replacement of coarse aggregate its is also decrease after replacement of more than 30%.

The properties of concrete increased linearly with the increase in ceramic aggregate up to 30% replacement later it is decreased linearly.

The split tensile strength of ceramic tile aggregate is very much in a straighter path compared to the conventional grades of concrete.

- **Using recycled coarse aggregate and ceramic waste to produce sustainable economic concrete (**Mustafa Batikha, Syed Talha Muhamma Ali, Ali Rostami & Meirzhan Kurtayev)

In this research, experimental work was conducted to validate the efficiency of Ceramic Waste Powder (CWP), Ceramic Fine Aggregate (CFA) and Recycled Coarse Aggregate (RCA) as a replacement for cement, Natural Fine Aggregate (NFA) and Natural Coarse Aggregate (NCA) respectively. The importance of this study is the utilization of ceramic waste and RCA together in the concrete mix in order to decrease usage of natural resources in production of concrete, and also to reduce carbon emissions from cement production and dependency on landfills for C&D materials. Eight concrete mixes were prepared in this study, and the mechanical properties, shrinkage, cost and CO_2 emissions were obtained for each mix.It was found that a concrete mix with 100% replacement of NCA by RCA, 20% cement replacement by CWP and 20% NFA replacement by CFA was 26% more advantageous than the control mix in terms of being sustainable and economic. This product proved to be a promising mix, 47% of whose conventional concrete components could be replaced by recycled materials.

III. CONCLUSION

Concrete strength is depend on the many factors like water cement ratio, proportion of coarse aggregate, fine aggregate and cement. Generally according to research paper a concrete strength is increase with increase ceramic waste as a coarse aggregate but its increase up to 20% to 30% replacement of ceramic waste as a coarse aggregate bur if coarse aggregate is replace more than 30% compressive strength of concrete is decrease with increase a content of ceramic waste because ceramic waste sock water so water cement ratio is changed. Also ceramic waste have a small void present so its required more cement content for increase a strength of concrete.

If ceramic waste replace as a fine aggregate its very difficult to maintain a workability of concrete because its shock a water and so workability of concrete in decrease.

Ceramic waste use as a fime aggregate a compressive strength of concrete is decrease if fine aggregate is replace more than 20 to 30% so small void id present in the ceramic waste so more cement content is required for more surface area of ceramic waste.

IV. REFERENCE

- To Enhance the Strength of Concrete by Partial Replacement of Coarse Aggregate with Tile Waste (Prof.Akshay B. Rahane, Vrushali S. Jagtap, Papiha R. Wade, Mohammad Ismail)
- The Effect of Ceramic Waste as Coarse Aggregate on Strength Properties of Concrete (E. E. Ikponmwosa,* and S. O. Ehikhuenmen)
- Partial Replacement of Coarse Aggregate By Waste Ceramic Tiles (Priyanka Kusum, Sayed Tabish Quadri)
- Using recycled coarse aggregate and ceramic waste to produce sustainable economic concrete (Mustafa Batikha, Syed Talha Muhamma Ali, Ali Rostami & Meirzhan Kurtayev)
- Partial Replacement of Aggregate with CeramicTile Waste in Concrete-A Review