Experimental Study on Partial Replacement Fine Aggregate by Broken Tiles in Concrete

Manoj Dangi[1] Sandeep Gupta[2]
[1,2]Department of Civil Engineering
[1,2]SIRTE, Bhopal M.P., India

Abstract— As per preservation endeavors, this examination concentrates on the waste tile aggregate as partial fine aggregates replacement for concrete creation, the counter active action of ecological contamination with considering the components of reasonable and cost-sparing development ventures, particularly material utilization. Moreover, many of the construction industry in India produce construction waste that contributes largely to solid waste. Utilizing ceramic tile waste, this research will focus on ceramic wastes obtain from the construction industry in India. Presently, much of ceramic industries production goes to waste, which is not undergoing the recycle process yet. In our work, total 180 cubes, 45 beams, 45 cylinders were cast with four different proportion. Ceramic waste as partial replacement of fine aggregates with the percentage of 10%, 20%, 30% and 40%of ceramic aggregates as partial replacement of fine aggregates with M-20, M-25 and M-30 grade of concrete. Besides that, all other parameters are constant. The concrete cube, beams and cylinder were tested as destructive test at last which is compression test, that to find out compressive strength ,tensile strength, and flexural strength of specimens of hardened concrete at 7, 14, 28 and 50days.From the results of the study, samples of concrete with 0 to 40% ceramic fine aggregate replacement have reached optimum strength. Findings showed that concrete containing Ceramic Tile 0 to 30%showed the highest amount of compressive strength, flexural strength and split tensile strength of concrete. And decrement at 40% contain Ceramic Tile.

Key words: Coarse Aggregate Compressive Testing Machine Compound Annual Growth Rate

I. INTRODUCTION

Cement and aggregate, which are the most basic constituents used in concrete production, are the basic materials required for the construction industry. This certainly incited a constant and extending enthusiasm of natural materials used for their production. Parallel to the necessity for the utilization of the natural resources builds up a creating stress for guaranteeing the earth and a need to spare natural resources, for such as aggregate, by using elective materials that are either reused or discarded as a waste Ceramics are regularly utilized as a part of the fabricate of the divider and floor tiles, and blocks and material tiles. Clean ceramics, as with all other ceramic items, are delivered from normal materials which by and large contain kaolin, china mud, feldspar, potassium, and quartz (F. Pacheco and S. Jalali, 2010). Ceramics industry joins the going with portions: ceramic deck and divider covers (ceramic floor and divider tiles, independently), ceramic sterile item, squares and material tiles, willful materials, ceramics for inventive applications (encasings, et cetera.), and ceramic articles for family unit and lighting up purposes (flatware and trimmings).

A. Objectives

To study the strength developments hardened concrete with waste ceramic coarse aggregate. To replace the fine aggregates with various percentage 10%,20%,30%&40% of ceramic waste in M20,M25& M30 concrete. To determine the effect of various percentage of ceramic waste as partial fine aggregates replacement towards compressive, split tensile, flexural strength of concrete. To determine the water absorption of ceramic aggregate concrete containing various content of ceramic tile as partial fine aggregates replacement material. To study the effect of compressive, split tensile, flexural strength characteristic properties of ceramic waste in concrete.

1) Cement:

Ordinary Portland Cement of Grade 53 is utilized, which adjusting IS 12269 Cement might be recommended asa material with adhesive and cohesive properties which make it fit for bonding material sections into a minimal entirety. The most ordinarily utilized cement in development today is Portland cement and thus Ordinary Portland Cement of 53 grades has been chosen for the examination. It is dry, fine and free of bumps.

2) Aggregates:

Natural aggregates utilized as a part of the fabricate of concrete clearing squares should meet the necessities for aggregates for concrete given in IS 383 Aggregates from normal sources – Aggregates for concrete. Slag aggregates may likewise be utilized on the off chance that they can be appeared to be physically and artificially stable. Squander materials, or materials not popular, are frequently looked for after as these are by and large generally modest. Yet, the utilization of such materials could be to the detriment of value or result in expanded expenses because of the need to utilize higher cement substance to look after quality. These materials may likewise make compaction challenges which could unfavorably influence efficiency and toughness. The execution of aggregates at the trim stage and in the solidified piece relies upon the consolidated impacts of molecule measure, evaluating, molecule shape, and hardness. Each of these properties is talked about beneath.

II. RESULTS AND DISCUSSION

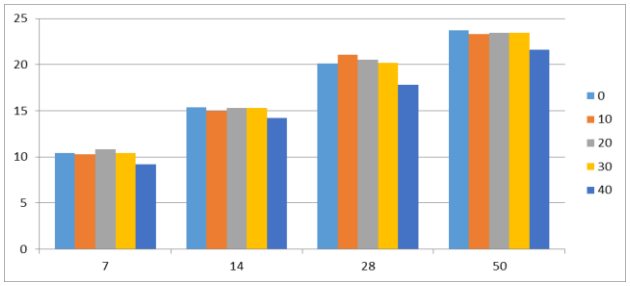

Fig. 1: Compressive Strength of Concrete Using Broken Tiles (M20)

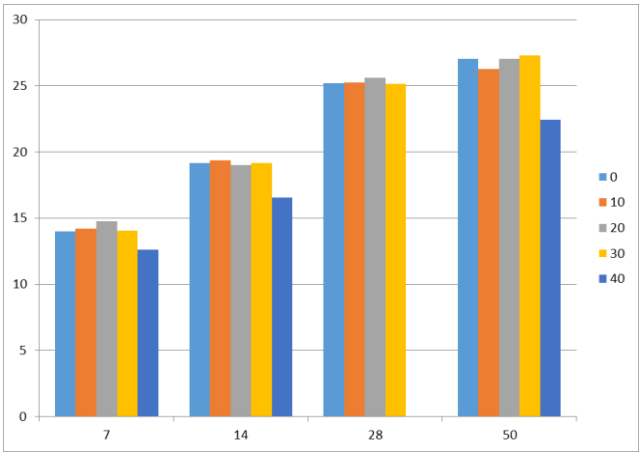

Fig. 2: Compressive Strength of Concrete Using Broken Tiles (M25)

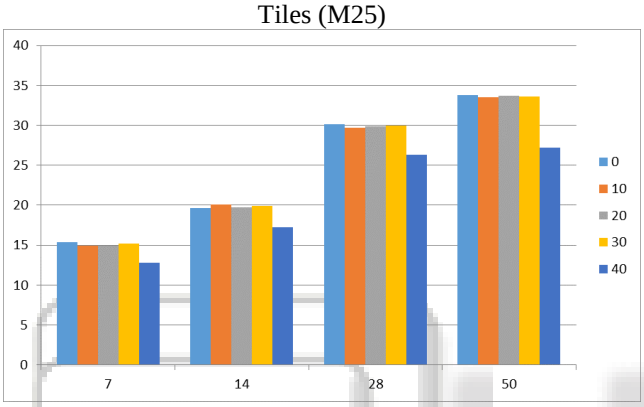

Fig. 3: Compressive Strength of Concrete Using Broken Tiles (M30)

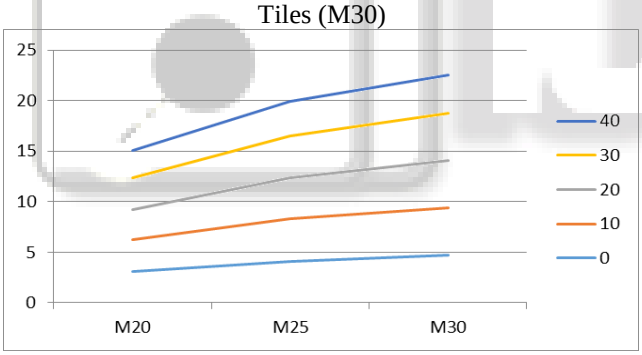

Fig. 4: Result of Split Tensile Test of Concrete Using Broken Tiles (Line Graph)

III. Conclusion

Conclusion drawn from this study is given below

- Compressive quality outcomes speak to that concrete threw within M20, M25 and M30 review of concrete at 7, 14, 28 and 50 days are increment, when the level of the aesthetic waste squashed tile aggregate expansion from 0%to 30%. And decrement at 40%
- We can see that the split tensile strength of concrete is extended when the level of the fired waste squashed tile aggregate have increments from 10%,20%, 30% and decrement at 40% use as an incomplete substitution in concrete at 28 days with M20, M25, and M30 review.

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