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Experimental Study on Properties of Concrete using Industrial Waste Ceramic and Stone Dust with Partial Replacement of Cement and Sand

Dinesh Kumar[1], Afzal Khan[2]

[1]M Tech Scholar, [2]Professor,
[1,2]Department of Civil Engineering, Millennium Institute of Technology, Bhopal, Madhya Pradesh, India

ABSTRACT

The concrete is made with any material wastes which are eco-friendly to make the pollution free called Green concrete. Green concrete is a revolutionary topic in the history of concrete industry. As we are all civil engineers we people plays important role in environmental aspects in the manufacturing of cement. Scope of using alternate materials as partial replacement of fine Aggregate is being searched for Concrete without sacrificing strength or increasing strength from economical & other aspects like using Stone Dust for its efficient use.In this experiment cement is replaced 0%, 5%, 10%, 15% and 20% of its weight by ceramic waste and fine aggregate is replaced 20% of its weight by stone dust in all concrete mix and there effects are studied. Investigations were done on M-35 grade of concrete by replacing Industrial Waste Ceramic and Stone Dust With Partial Replacement of Cement And Sand to get maximum strength.

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INTRODUCTION

Concrete is the most widely used construction material. Because of its specialty of being cast in any desirable shape, it has replaced stone and brick masonry. Plain concrete is weak in tension and has limited ductility and little resistance to cracking. Micro cracks are present in concrete because of its poor tensile strength. The cracks propagate with the application of load, leading to brittle fracture of concrete.

Ceramic wastes

The principle waste coming into the ceramic industry is the ceramic powder, explicitly in the powder structures. Earthenware squanders are produced as a loss during the most common way of dressing and cleaning. It is assessed that 15 to 30% waste are created of absolute natural substance utilized, and albeit a piece of this waste might be used nearby, for example, for uncovering pit top off, the removals of these waste materials obtain huge land regions and stay spread for what it's worth, ruining the stylish of the whole area. It is undeniably challenging to track down a utilization of artistic waste created.

Figure 1 Sample Ceramic wastes

Stone dust

Stone dust is a waste material obtained from crusher plants. It has potential to be used as partial replacement of natural river sand in concrete. Use of stone dust in concrete not only improves the quality of concrete but also conserve the natural river sand for future generations.

Objectives

To analysis overall strength (Compressive, split tensile & flexural Strength) of concrete Using Industrial Waste Ceramic and Stone Dust.

Slump Test

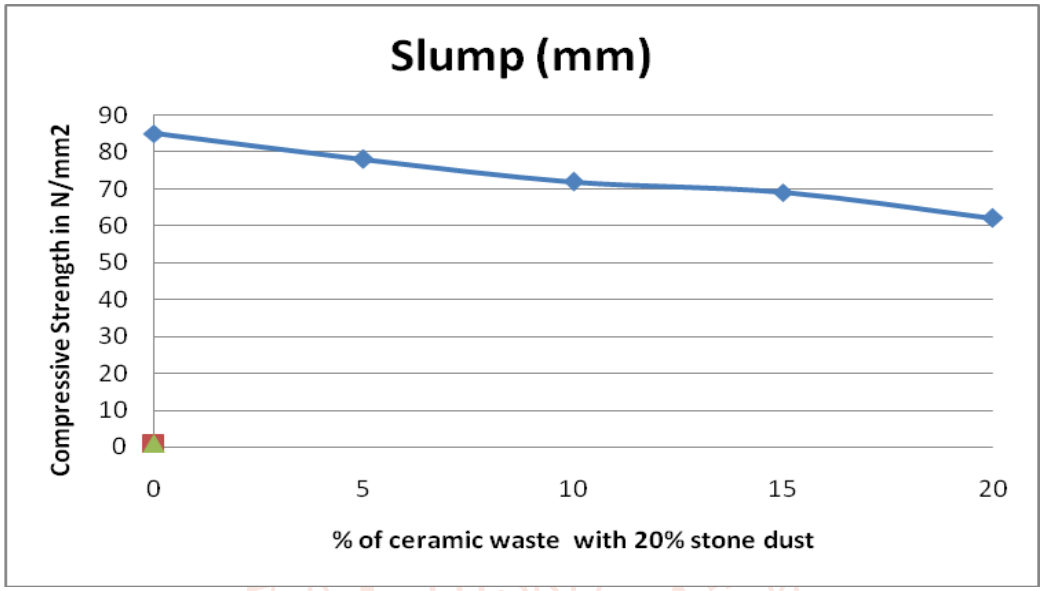

Figure 2 Slumps of M-35 Grade ceramic waste with% Stone dust using line chart

Discussion: By analyzing the slump value, it is understand that the slump value is always decreases by increasing the percentage of the ceramic waste with% Stone dust using.

COMPRESSIVE STRENGTH TEST

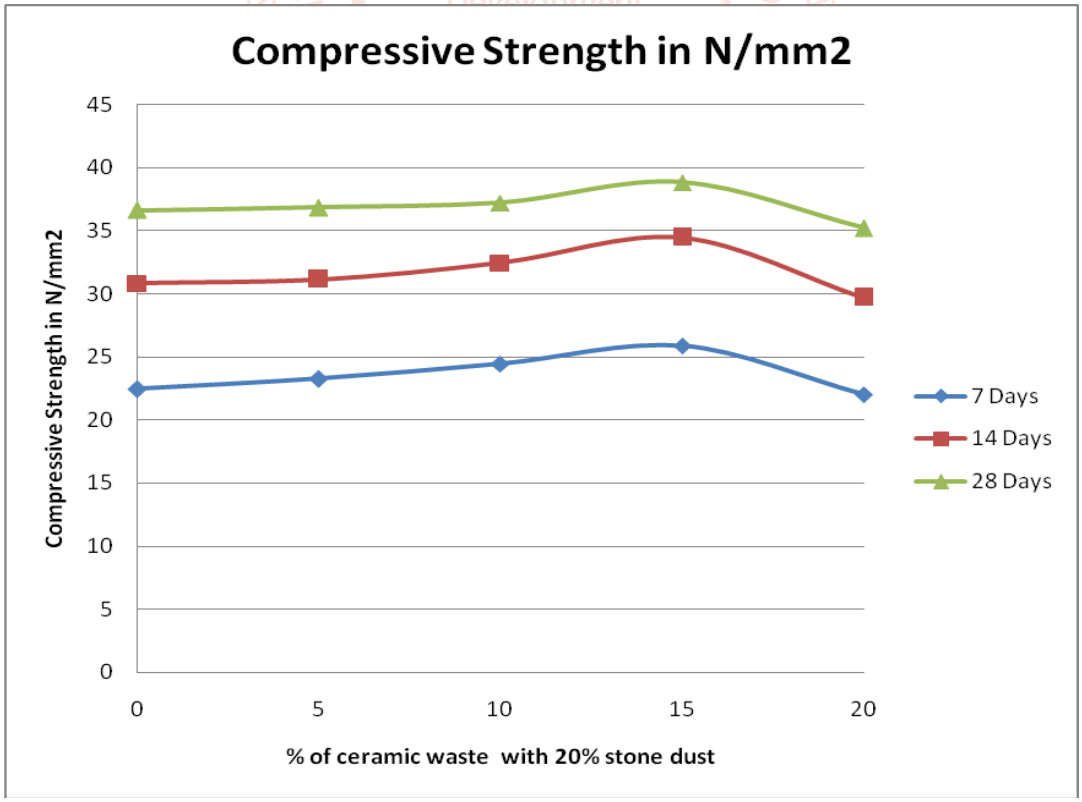

Figure 3 Compressive Strength of M-35 Grade ceramic waste with% Sone dustusing line chart

Discussion: From the above table is seen that the compressive strength replacing with 0 to 15% Cement by ceramic waste the strength in M 35 grade of concrete at 7, 14 and 28 days increases when the percentage of the ceramic waste increase after the adding ceramic waste strength is decreases.

FLEXURE STRENGH TEST

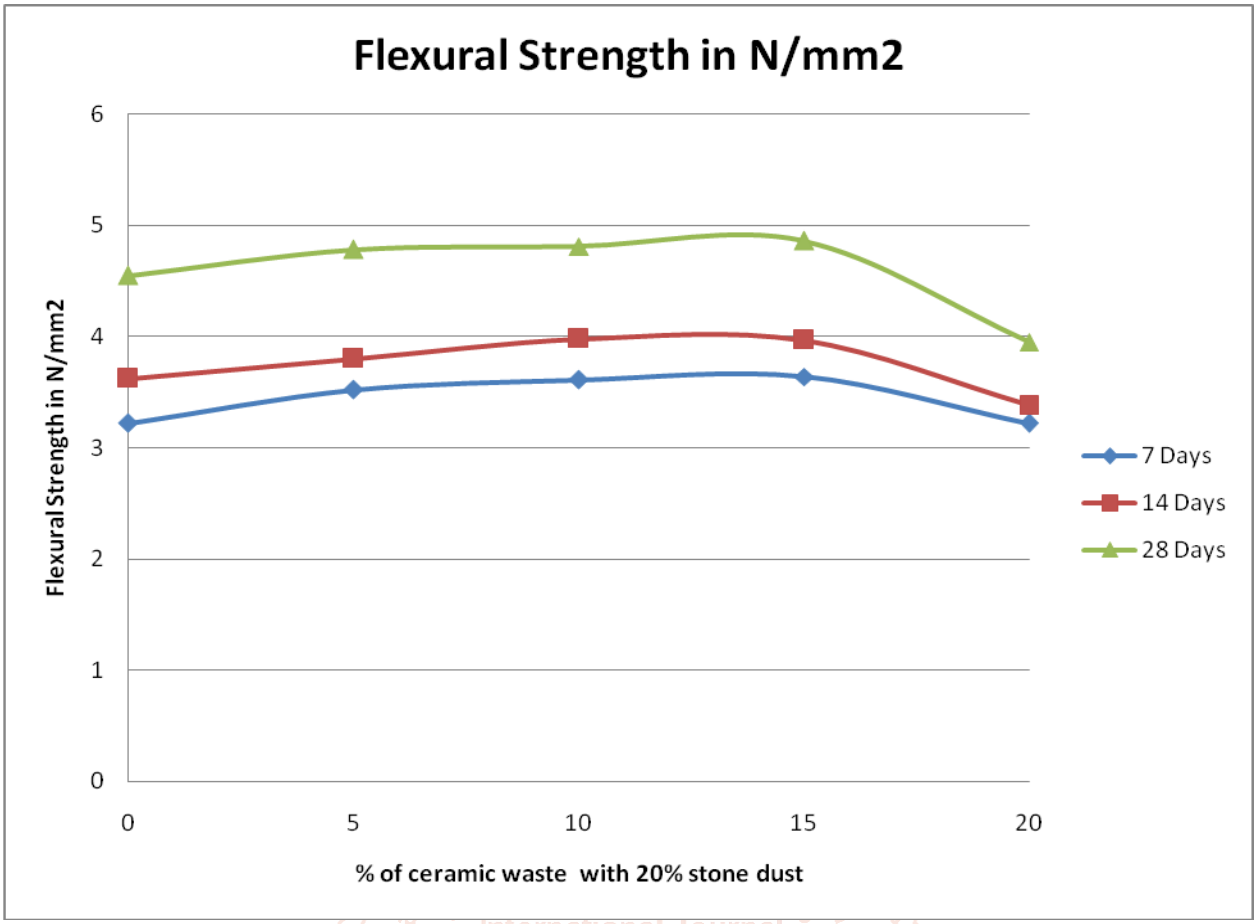

Figure 3 Flexure Strength of M-35 Grade ceramic waste with% Stone dust using line chart

SPLIT TENSILE STRENGH TEST

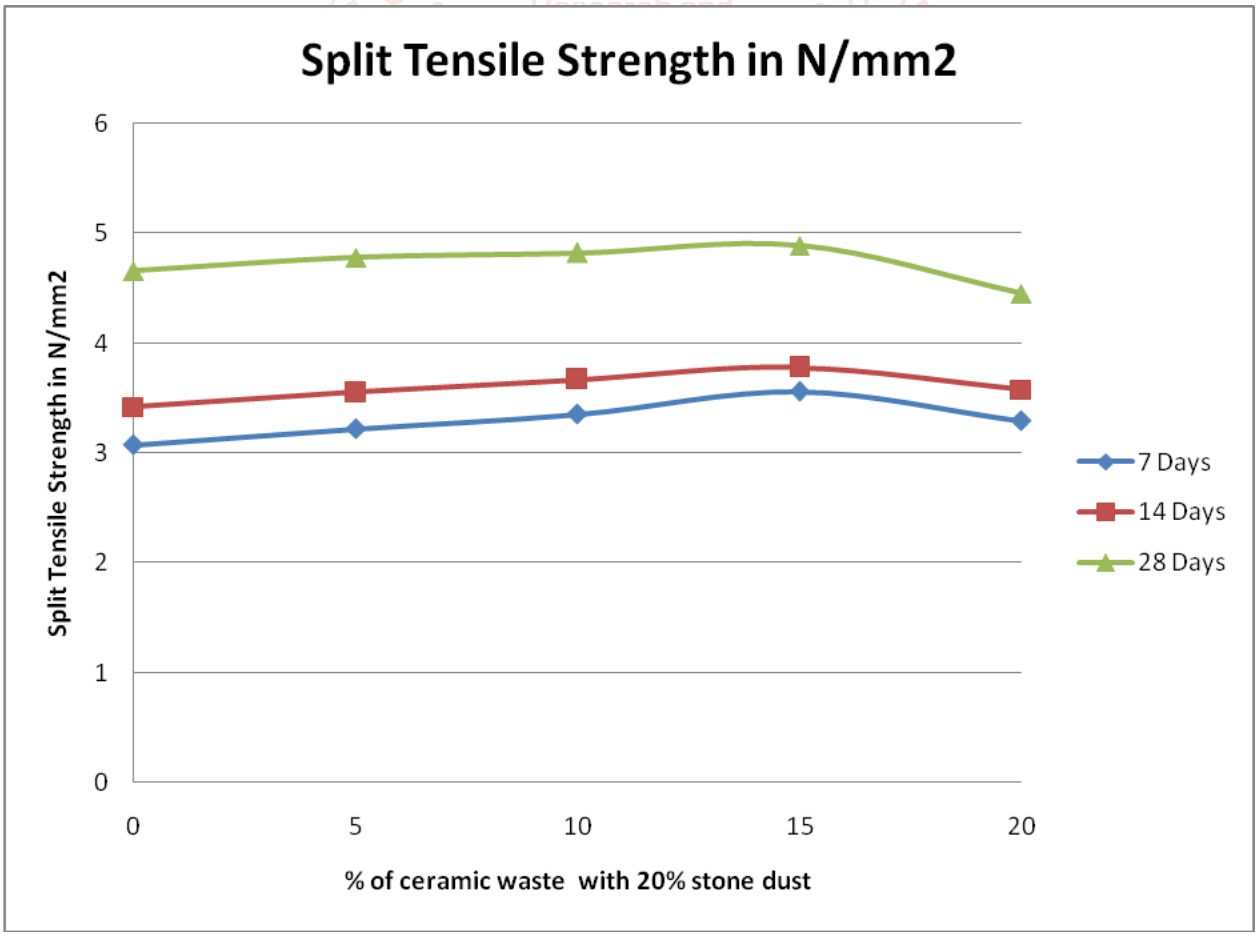

Figure 4 Split Tensile Strength of M-35 Grade ceramic waste with% Stone dust using line chart

Discussion: From the above table is seen that the split tensile strength in M 35 grade of concrete with 0 to 15% Cement by ceramic waste the strength in M 35 grade of concrete at 7, 14 and 28 days increases when the percentage of the ceramic waste increase after the adding ceramic waste strength is decreases.

Conclusion-

- Concrete on 15% replacement of cement with ceramic waste and 20% replacement of fine aggregates with stone dust, 28 days compressive strength obtained is 38.85N/mm2, Split Tensile strength obtained is 4.89 N/mm2 and Flexural strength obtained is 4.86N/mm**2** in M35 grade and hence it becomes more economical without compromising concrete strength than the standard concrete.

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