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A Rivew of Investigation on effect of glass powder and wood apple in concrete

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***Abstract*—**Today construction industry is searching a cost effective material for construction to increase the strngh.The disposal of waste glass is an environmental issue. The global warming is caused due to the emission of green house gases, such as CO2, to the atmosphere. Among the greenhouse gases, CO2 contributes about 65% of global warming. The global cement industry contributes about 7% of greenhouse gas emission to the earth's atmosphere. Consequently efforts have been made in the concrete industry to use waste materials as partial replacement of coarse or fine aggregates and cement. Waste glass is one material which gives the properties like pozzolanic properties so that it is used as a partial replacement for cement in concrete. In this paper, an attempt has been made to find out the strength of concrete containing waste glass powder as a partial replacement of cement for concrete.

Keywords—Waste glass, Wood apple , Cement, Concrete, compressive strength, Flexural strength

I. INTRODUCTION

Concrete is by far the most widely used construction material today. Concrete has attained the status of a major building material in all branches of modern construction because of following reasons. It is possible to control the properties of cement concrete with in a wide range by using appropriate ingredients and by applying special processing techniques-mechanical, chemical and physical. It is possible to mechanize completely its preparation and placing process. It possesses adequate plasticity for mechanical working. It is difficult to point out another material of constructions which is as versatile as concrete. Concrete is by far the best material of choice where strength, durability, permanence, impermeability, fire resistance and abrasion resistance are required. In present world, inflation is one of the main problems faced by every country. It has become essential to lower the construction cost without much compromise as far as strength and durability of the structure is concerned. The lowering of cost can be brought about in number of ways. Among all the methods available the most optimum at our disposal is the use of waste material as substitute. The basic requirement of all mankind is shelter. Hence the shelter is based on the building construction in which the cement concrete is an essential requirement. The cement concrete is a well-known building material and has occupied an indispensable place in construction work. From the materials of varying properties, to make concrete of stipulated qualities and intimate knowledge of the interaction of various ingredients, that go into the making of concrete is required to be known, both in plastic Condition and in the harden condition. The strength of concrete depends upon the components such as aggregate, quality of cement, water-cement ratio, and workability, normal consistency of mix, proportion and age of concrete.

II. MATERIAL AND METHODS

Cement: The cement used in this study was 43 grade Ordinary Portland cement (OPC) confirming to IS 8112- 1989.

Fine aggregate: Locally available sand confirming to zone II with specific gravity 2.62 was used. The testing of sand was done as per Indian Standard Specification IS: 383-1970.

Coarse aggregate: Coarse aggregate used was 20mm and down size and specific gravity 2.93. Testing was done as per Indian Standard Specification IS: 383-1970.

Glass: Waste glass available locally was collected and made into glass powder. Glass waste is very hard material. Before adding glass powder in the concrete it has to be powdered to desired size.

III. LITERATURE RIVEW

A. Experimental Study on Strength of Concrete by Using Artificial Fibers with Rice Husk Ash by SANDESH D. DESHMUKH, PRAVIN V.DOMKE, SATISH D. KENE, R.S.DEOTALE (2008)

This paper including the study of workability of fresh concrete, compressive strength, flexural tensile strength, splitting .This paper reports on a comprehensive study on the properties of concrete containing rice tensile strength, modulus of elasticity for hardened concrete. Rice husk ash content was use from 0 percent to 20 percent in the interval of 2.5 percent in weight basis. It was found that the strength of concrete reduces after further addition of 12.5 percent of rice husk ash.

B. A Laboratory Study on Use of Waste Glass Powder as Partial Replacement of Cement in Concrete Production by SOMBIR, PARVEEN BERWAL(2017):

This study was con- ducted to investigate the effect of using waste glass powder in concrete. Laboratory work was conducted to determine the performance of control sample and concrete with used waste glass powder. The performance of these types of concrete was determined by the work- ability test, density test and compressive strength test.The worka-bility of concrete is determined using slump test. Meanwhile, compressive strength test is done to determine the strength of concrete. For each type of concrete sample, a total of six 150mm x 150mm x 150mm cubes were cast. The cubes were

tested at the ages of 7 and 28 days to study the development of compressive strength. The results indicate that the concrete with using waste glass powder were able to increase the workability of concrete and also the compressive strength. However, the density is reduced compare to standard mix- ture of concrete.

C. ***M40 Concrete with Marble Dust, Clay (POP) and Wood Apple by Shilpa Jain And Prof. Anubhav Rai, February 2015***

This following work is to Design M40 concrete with marble dust and clay (POP) as a partial replacement of cement by 5 percent, 10 percent, 15 percent,and 20 percent. The compres- sive strength test after 7 days and 28 days have also been performed. The constant amount of Wood apple is also used. The result on the basis of compressive strength of the 150mm standard cube has been shown by the graph between varying percentage of marble dust and clay(POP) and compressive strength. The idea is to achieve higher strength concrete in economical manner by finding the substitute of cement to some extent. The comparative study between the con- crete with Wood apple and without Wood apple have also done and results have been shown by the graphs.

D. ***"Influence of Glass Powder on the Properties Of Concrete" by Veena V. Bhat , N. Bhavanishankar Rao , Oct.2014***

In that paper they have used glass powder in per. Of 0,5,10,15,20. The replacement of cement by glass powder in concrete increases the compressive strength of concrete. Increase of 27% strength can be achieved when 20% cement was replaced by glass powder in concrete when water/ cement ratio was maintained constant. Slump test was carried out and the slump was found to be 70 to 72mm even with 20% replacement.**"Performance of Using Waste Glass Powder In Concrete As Replacement Of Cement " by Gunalaan Vasudevan and Seri Ganis pillay in Nov 2013**

In that paper they have used various types of coloured glasses and chemicals compostion to check the behavior of the concrete and check the compressive strength of concrete after addition of chemical compounds and various colourd glass powders. The workability of the concrete increases as well as the strength of the concrete increses and the concrete becomes lighter than the normal concrete.

" Glass Powder – A Partial Replacement for Cement? " by Ashutosh Sharma in February 2015

In that paper they have done Numbers of test to study the effect of 5%, 10% and 15% replacement of cement by glass powder on compressive strength and durability. The particle size effect was evaluated by using glass powder of size 600µm-100µm.The results showed that the maximum increase in strength of concrete occurred when 10% replacement was done with glass powder.

E. ***"Concrete with Marble Dust, Clay (POP) and Wood Apple " by Shilpa Jain And Prof. Anubhav Rai, February 2015.***

In that paper they have used wood apple for better result with marble dust and clay. The constant amount of Wood apple is also used. The result on the basis of compressive strength of the 150mm standard cube has been shown by them with the help of graph between varying percentage of marble dust and clay with compressive strength.

OBJECTIVE:

The main objective is to compare or match the compressive, flexural and tensile strengths for the designed mix specimen (M20) with conventional and replaced concretes.

TOOLS/ TESTINGS /SOFTWARES

Compressive Strength of concrete, Flexural Strength of concrete, Split Tensile Strength of concrete, Plastic state Tests

Conclusion:

In this paper ,from all the research papers some pints are shows as follows:

- The partial replacement of cement by glass powder gives the good strength.
- Waste material like glass and wood apple is used in a proper way.
- Solid waste should be avoided by using in a construction field.

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