

A Review Paper on Partial Replacement of Fine Aggregate And Cement With Copper Slag And Fly Ash

Prof. M. P. Bastwadkar¹, Miss. Amruta .R. Shelke²

¹Associate Professor, Dept of Civil Engineering

²Dept of Civil Engineering

^{1,2} JSPM's Imperial College of Engineering and Research, Wagholi, Pune, India

Abstract- *The main objective of this review study is to collect various examination studies available by different researchers for waste utilization of copper slag in concrete through various techniques. Concrete is used in huge amount almost the world over mankind has a requirement for infrastructure. Waste materials increases day by day and creates pollution in the environment. Researchers studied to reuse the useful waste into the concrete like steel slag, copper slag and polymer wastes by using this process we can make concrete economical by replacing waste materials through fine aggregates.. The primary objective of this paper is to study the application of copper slag and fly ash as an alternative replacement material of sand and cement. Also studies the result of substitution of Fine aggregate with copper slag on mechanical performances of concrete In the present situation carbon discharge and sand mining are major concern due to its hazardous effect to atmosphere and making serious difference to the ecosystem. Various studies have been conducted to decrease severe effect on atmosphere, using by products like copper slag and fly ash as partial substitution of fine aggregate and cement. Researchers studied to reuse the useful waste into the concrete like steel slag, copper slag and polymer wastes by using this process we can make concrete economical by replacing waste materials through fine aggregates A comprehensive review of studies has been presented in this paper for scope of substitution of fine aggregate from copper slag in concrete.*

Keywords- Copper slag, Fly ash, Fine aggregate, Replacement, Concrete, Strength.

I. INTRODUCTION

Cement is one of the generally acknowledged development material in the advancement of foundation. It impeccably coordinates with a few necessities like quality, solidness, impermeability, and imperviousness to fire and scraped spot obstruction. Bond and fine total is the principle fixing used to make solid, which are gotten from common assets. Bond is a fake material fabricated with the normally

accessible limestone, silica and gypsum. Totals are viewed as one of the fundamental constituents of cement since they involve over 70% of the solid lattice. Because of increment in development prerequisite, the utilization of these normal assets expanded a ton which will prompt shortage of these materials in future. So as to lessen reliance on normal totals as the principle wellspring of total in cement, misleadingly produced totals and counterfeit totals created from modern squanders give an option in contrast to the development business. In this way, usage of totals from modern squanders can be option in contrast to the common and fake totals. The other primary bit of leeway of utilizing such materials is to decrease the expense of development. The new material ought to be condition cordial and ideally use mechanical squanders created because of quick industrialization.

II. LITERATURE REVIEW

Khalifa S. Al-Jabri (2009)

In this paper author study the performance of high strength concrete (HSC) made with copper slag as a fine aggregate at constant workability and to check the result of super plasticizer addition on the properties of HSC made with copper slag. Two series of concrete mixtures were ready with completely different proportions of copper slag. The first series consisted of six concrete mixtures ready with completely different proportions of copper slag at constant workability. The water content was adjusted in every mixture so as to get identical workability as that for the control mixture. Twelve concrete mixtures were ready within the second series. The results indicated that the water demand reduced by nearly 22% at 100 percent copper scum replacement compared to the normal mixture. The strength and durability of HSC were usually improved with the rise of copper lag content within the concrete mixture. . All concrete mixtures did not meet the strength and durability design requirements due to the separation and dryness of the concrete paste. Thus it is concluded that the utilization of copper slag as

sand substitution improves HSC strength and durability characteristics at same workability whereas super plasticizer is incredibly necessary ingredient in HSC created with copper slag so as to produce sensible Workability and higher consistency for the concrete combine.

J. Karthick & S. Suriya Prakash (2014)

In this paper various proportions of copper slag replacement with sand (0%, 10%, 20%, 30%, 40% & 50%) and partial replacement of fly ash with cement 30% in concrete discovered that the compressive strength of concrete cubes with 40% substitute of fine aggregate with copper slag shows an increase of 15% when compared to the normal concrete cube. likewise, there was increased in the split tensile strength of concrete with 40% substitution of fine aggregate with copper slag shows an increase of 34% when compared to normal concrete.

Tusharkumarg. Chauhan (2018)

In this paper the replacement of natural resources within the manufacture of cement and sand is the present problem in the present construction situation. Fly-Ash, Copper slag and Ground Granulated Blast Furnace Slag (GGBFS) are industrial waste material produced from the process of manufacturing coal, copper and iron. Use of Fly-Ash, Copper slag and GGBS does not only decrease the cost of construction but also helps to decrease the impact on atmosphere by consuming the material generally considered as waste material. Current study with reduce the cost of cement and sand with concrete mix grade M20 by studying the mechanical performance of this concrete mix by partial replacing with such as Fly-Ash, Copper slag and GGBS in concrete mix. In this study, partial replacement of Cement with Fly-Ash and Sand with Copper Slag and coarse aggregate with GGBFS considered. Experimental study is carried out to determine the workability and strength characteristics of hardened concrete, properties of concrete have been assessed by partially replacing cement with GGBS, and sand with Copper Slag. The cement has been replaced by Fly-Ash accordingly 10% and sand has been replaced by Copper slag accordingly 30% based on past research paper. Coarse aggregate has been replaced by GGBFS consequently (without Fly-Ash and Copper slag), 20%, 40%, 60%, 80% and 100% for M20 mix. Concrete mixtures were prepared, tested and compared in terms of compressive, flexural and split tensile strength with the normal concrete mix.

Abhisheka H Honnakkalavar (2018)

This paper includes the impact on concrete utilizing copper slag as substitution of fine aggregate. In this undertaking work, M25 concrete was taken for mix design. The properties and attributes of materials for cement, fine aggregate, coarse aggregate and copper slag was examined for mix design. The compressive, split tensile and flexural quality of cement were examined for different substitutions of fine aggregate by utilizing copper slag that are 0%, 20%, 40%, 60%, and 80%. At 40% substitution of fine aggregate, the Concrete additions higher compressive quality, at 7 and 28 days. The most extreme split tensile strength and the flexural quality were likewise gotten at 40% substitution level at 28 days.

III. CONCLUSIONS

From the above research papers, it is concluded that copper slag and Fly ash can be effectively used as replacement material for fine aggregate and cement enables the large utilization of waste product. Copper slag has lower absorption and higher strength properties than fine aggregate. In other hand replacement of Fly ash by cement also effective. Replacement of copper slag increases the self weight of concrete specimens to the maximum of 30% to 40% . Using fly ash as cement replacement resulted in a reduction on the maximum temperature rise under adiabatic curing condition.

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