

A Review: An Experimental Investigation of using Demolished Concrete and Fresh Aggregate in Concrete Mix Design

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Abstract— The rapid urbanization and industrialization of the world in the last few decades has led to the ever rising demand of construction materials especially aggregates. Mining of these aggregates has led to a strain on the environment and in serious ecological damage. Thus mining has been banned in some states by the government. The shortfall of construction aggregates is a serious problem and necessitates the use of other recycled aggregates as its replacement. Recycled aggregates are obtained from old demolished construction waste. Usually they are transported to a landfill site where they are disposed. The expansion of cities in the past decades has not only made landfill sites farther but also at the same time made the transportation of these aggregates costlier.

Key words: Demolished Concrete, Fresh Aggregate

I. INTRODUCTION

Construction is the backbone of infrastructural development and it derives its basic ingredients, which are sand and stone aggregate from nature. In the current scenario, the construction works is on boom, which leads to various environmental hazards. The construction industry has ruined the ecological balance up to a great extent by taking away the natural stock of aggregates. The heavy machinery involved to extract the stone aggregates from quarrying operates on fuels releasing obnoxious gases and fumes. The air pollution from quarrying caused by release of suspended particulate matter into the atmosphere leads to danger for the working staff and the adjoining population.

To facilitate the non-use of natural aggregates from the nature, various steps to be taken by the construction industry for the infrastructure development. The use of demolished aggregates is the new step in developing the Concrete for the construction practices.

A. Demolished Aggregate Concrete (DCA)

Demolished Concrete aggregate is a broad term used to coarse aggregate reused in various engineering applications. The size of gravel used the percentage of sand and gravel fraction in the Concrete mix, amount of lime in the sand fraction of the old mix, etc. They can be substituted with varying percentages of replacement for coarse and coarse aggregates in new mixes. The use of Demolished Concrete aggregate started early in west but is still not very common in India. The potential of using demolished Concrete aggregate as a way to mitigate environmental pollution is tremendous.

B. Objectives of Thesis

- To study the properties of recycled fine aggregates for their use in Concrete.
- To compare the fresh and the hardened properties of Concrete made in different proportion of recycled fine

aggregates with the Concrete using fresh aggregates and to justify the use of recycled fine aggregates in Concrete

II. LITERATURE REVIEW

Kanish Kapoor et al(2016), were concluded that The workability properties of varied SCC mixes were assessed victimisation slump flow check, V-funnel check, L-box check and J-ring check. Sturdiness performance of the SCC mixes was investigated victimisation fast chloride permeability check, initial surface absorption check, water penetration check, and capillary suction check.”

N. Kisku et al (2017), were concluded that “The ever increasing population and urbanization has led to construction of high rise structures and demolishing existing old low rise ones. This has become not only the cause of natural resources depletion at an alarming rate but also gradually becoming a challenge for sustainability. Concrete industry consumes a majority of natural resources especially in developing countries. In recent years the Concrete industry has started using Construction and Demolition (C&D) waste in structural Concrete application owing to the availability of waste from demolition of old structures and the reduction in cost of acquiring aggregates. This can allow the Concrete industry to reduce its carbon footprint and thus help it to continue to grow without harming the environment. In this backdrop, this paper provides an account of properties of Concrete prepared with recycled aggregate, analyses the important findings on Recycled Aggregate Concrete (RAC) in the recent time and discusses the suitability of its usage in construction. The open literature suggests that the durability and mechanical properties of RAC is slightly inferior than that of conventional Concrete. However, with the use of admixtures and modified mixing approaches, the desired properties of RAC can be obtained. Collation and analysis of more than 200 research papers in this area on various facts of Recycled Aggregate Concrete, on one hand, may be considered as a step ahead for formation of design methodology and, on the other hand, a valuable stating document for further research.”

Shakeel Ahmad Waseem and Bhupinder Singh (2016), were concluded that “Initially uncracked push-off specimens were tested to investigate shear transfer in recycled aggregate Concrete with Concrete grade, normal force and the replacement level of recycled aggregates being the variables. A marginal increase in normalized shear strength was noted when the natural coarse aggregates were replaced with the recycled aggregates. Normal force and Concrete grade had the most significant effect on the measured strengths and predictions obtained from modified Zia failure criterion were in good agreement with the experimental results of the natural as well as the recycled aggregate Concretes. Selected shear strength models in the

literature have been reviewed for their predictive efficacy and in the context of design, the PCI code gave reasonably accurate and conservative predictions of the measured shear strengths of both the Concrete types”

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