REUSE OF CONSTRUCTION AND DEMOLITION OF DEBRIS IN CONSTRUCTION TECHNOLOGY

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ABSTRACT

Recycling concrete debris make a contribution to reduce the total environmental impact of the building sector. To increase the scope for recycling in the future, aspects of recycling have to be included in the design phase. Consequently, reclaiming aggregates from concrete debris would lead to environmental and economic benefits. This experimental study aimed to use crushed concrete debris as alternative fine aggregate in a mortar mixture. A conventional mortar mixture will be compared to concrete debris mixture of the same proportions. Demolition waste is waste debris from destruction of a construction. Construction industry in India generates about 10-12 million Tons of waste annually. While Retrievable items like bricks, wood, metal, titles are recycled in India. The production of waste due to the demolition of structures is more than the wastage which occurs during construction of structures, so there is need of management of Construction and Demolition (C&D) wastes, as distinct from Municipal Solid wastes, is a relatively new subject in India

I. INTRODUCTION

Demolition waste is waste debris from destruction of a building. Certain components of demolition waste such as plasterboard are hazardous once land filled as it is broken down in landfill conditions releasing hydrogen sulfide, a toxic gas. Waste from individual house construction or demolition,

- Find its way into nearby municipal bin/vat/waste storage depots, making the municipal waste heavy
- Degrade quality of municipal waste and makes it difficult for further treatment like composting.
- About 10-20 % finds its way into surface drains, choking them.

Construction and demolition (C&D) debris is the waste material that results from the construction, renovation, or demolition of any structure, including buildings, roads, and bridges. Typical waste components include Portland cement concrete, asphalt concrete, wood, drywall, metal, cardboard, plastic, and soil. This waste material has only recently gained attention as concerns about its environmental impact have developed. One of the things builders, developers and contractors must consider during construction, renovation or demolition is where to put all the debris. As what most people do in the preservation of the environment and for economic purpose, studies, researches and experiments are being done to discover new ways on how to find solution considering where else to put these debris and what can be done to lessen its disposal to landfills and since there is an increasing environmental problem regarding the waste disposal to landfills, it is necessary to to think of possible ways on how to avoid these problems and same time secure safety and convince , and that is, to recycle. To fully understand the environmental implications of Construction and Demolition debris, it is important to understand the size of the Construction and Demolition debris stream. The exact quantity of Construction and Demolitionist currently unknown.

II. LITERATURE SURVEY

Recycling of waste concrete is done to reuse the concrete waste as aggregates in concrete. The recycled aggregate have less crushing strength, impact resistance, specific gravity and has more absorption value as compared to fresh aggregates. Waste concrete are generated every year around the world in very large quantity due to following reasons:

- Destruction of old structure.
- Demolition of buildings and structures during earthquakes and wars.
- Ejection of useless concrete from structures, buildings, road, bridge etc.

Crushing and screening systems start with primary jaws, cones, or large impactors taking waste from 30 inches to120inches. A secondary cone or impact or may or may not need to be run, and then primary and secondary screens may or may not be used, depending upon the project, the equipment used and the final product desired. A scalping screen will remove dirt and foreign particles. A fine harp deck screen will remove fine material from coarse aggregate. Further cleaning is necessary to ensure the recycled concrete product is free of dirt, clay, wood, plastic and organic materials. This is done by water floatation, hand picking, air separators, and electromagnetic separators.
The demolished waste was collected and then crushed by manual hammer. The crushed debris, the demolished waste was collected and the crushed by manual hammer. The crushed debris was then passed through sieve of 22.4mm to 12mm sieve. The debris retained on 20mm and 16mm sieve was used as coarse aggregate various tests and experiments were made that served as the basis of this study and these are the following.

(1) **Slump test:** The concrete slump test measures the consistency of fresh concrete before it sets. It is performed to check the workability of freshly made concrete, and therefore the ease with

which concrete flows. It can also be used as an indicator of an improperly mixed batch.

(2) **Water absorption:** This test helps to determine the water absorption of coarse aggregates. For this test a sample not less than 2000g should be used. The apparatus used for this test are :- Wire basket – perforated, electroplated or plastic coated with wire hangers for suspending it from the balance, Water-tight container for suspending the basket, Dry soft absorbent cloth – 75cm x 45cm (2 nos.), Shallow tray of minimum 650 sq.cm area, Air-tight container of a capacity similar to the basket and Oven.

(3) **Compression test:** Out of many test applied to the concrete, this is the utmost important which gives an idea about all the characteristics of concrete. By this single test one judge that whether Concreting has been done properly or not. Compressive strength of concrete depends on many factors such as water-cement ratio, cement strength, quality of concrete material, quality control during production of concrete etc.

III. SUMMARY

This paper covers the reuse of debris concrete which was obtained when structures made of concrete are demolished or renovated, concrete recycling is an increasingly common method of utilizing the rubble. Concrete was once routinely trucked to landfills for disposal, but recycling has a number of benefits that have made it a more attractive option in this age of greater environmental awareness, more environmental laws, and the desire to keep construction costs down. Concrete aggregate collected from demolition sites is put through a crushing machine. Crushing facilities accept only uncontaminated concrete, which must be free of trash, wood, paper and other such materials. Metals such as rebar are accepted, since they can be removed with magnets and other sorting devices and melted down for recycling elsewhere.

- This study focused on designing concrete debris mixture that will meet the requirements of the I.S for mortar mix. These includes the mix proportion of concrete debris as mortar mixture , the workability of the mixture in terms of consistency, mobility, and compactness as mortar, the factors which affect the constancy and instability of the concrete debris mixture, and the advantage and disadvantage of used concrete debris mixture mortar mix.
- Crushing at the actual construction site using portable crushers reduces construction costs and the pollution generated when compared with transporting material to and from a quarry. Large road-portable plants can crush concrete and asphalt rubble at 600 tons per hour or more. These systems normally consist of a rubble crusher, side discharge conveyor, screening plant, and a return conveyor from the screen to the crusher inlet for reprocessing oversize materials.

IV. SCOPE AND CONCLUSION

This paper primarily reviews the reuse of debris concrete. This study aimed to seek improvement in the production and allocation of good quality construction products out of recycled materials. It also aimed to develop a design mixture of recycled concrete debris as a mortar mix. This will also provide knowledge to the contractors and developers on how to improve the construction industry method and services by using recycled concrete debris alternate fine aggregate in a mortar mix where they can achieve good product performance and meet recycling goals. With the rapid evolution, the construction needs and demolition waste has increased substantially. These wastes will possess serious environment threat if not disposed of properly. Instead of using it as landfill, it is possible to recycle it in the construction industry it will be of fabulous support to the depleting nature stock of resource. There is huge challenge to manage C & D waste in near future. Data should be generated on C & D waste generation and its characteristics

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