Application of Construction and Demolition Wastes in Construction

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Abstract: Waste from construction and demolition projects is the most significant and harmful pollution that exists today. Indian construction and demoliyion waste production is anticipated to be 150 million tonnes per year, according to the Building Material Promotion Council (BMPTC). This study involves creating concrete out of leftover materials from building and demolition.

Keywords: Fine aggregate; coarse aggregate; compressive strength; flexural strength.

I. INTRODUCTION

Every time construction or demolition work is done, such as when building a bridge, a road, a flyover, a mall, or when widening or remodelling a road, waste from those activities is produced. Concrete, plaster, metal, plastics,and other inert and non-biodegradable materials makeup the majority of C and D garbage. These wastes are large and bulky, taking up a lot of area along the sides of the road. Recent recognition of the potential for diversion of waste components from landfill has laid. C and D waste becoming a topic of interest for cycling. One solution for CDW high value recycling is to use it as recycled aggregate for concrete. The main Problem is that CDW characteristics are different from original aggregate and composition and heterogeneity are big variable that affect enormously the possibilities to apply it as source material. For this reason, it is needed to access waste property separately and then in the concrete mix to know suitability for this use. The aim of this project is to construct concrete using construction and demolition waste. For this we have to create concrete cubes and beams using CDW as fine aggragate and coarse aggregate.

II. MATERIALS

The cement we used is ordinary portland cement. The fineness of the cement is 1% and specific gravity is 3.51. We have collected the construction and demolition wastes and crushed them into the specific sizes. The size of fine aggregate(CDW) is in the range between 4.75mm and 0.075mm and that of coarse aggregate(CDW) between 40mm and 4.75. Specific gravity of sand is considered to be around 2.65.Here we got the specific gravity of coarse aggregate from CDW as 2.97 and that of fine aggregate from CDW as 2.13. Bulk density, void ratio and porosity of coarse aggregate(CDW) is 1.42g/cc, 0.914 and 0.48 respectively. Particle size distribution graph of fine and coarse aggregate from CDW is given below,

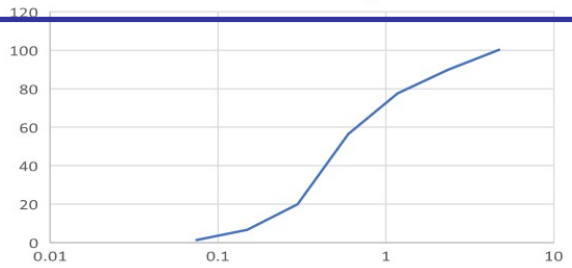

Fig-1: Particle size distribution graph of fine aggregate

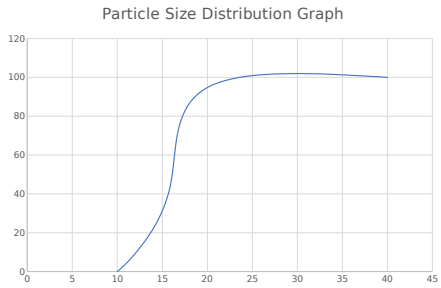

Fig-2: Particle size distribution graph of coarse aggregate

III. EXPERIMENTAL DETAILS

In this present research work we designed the mix proportion ratio as 1 : 0.872 : 2.161. For preparing 6 cubes of size 150*150*150 and 6 cubes of size 10*10*50 , the masses of materials are listed below. The cubes and beams were casted for 7-days and 28-days compressive strength and flexural strength.

Table-1

Mass of materials for concrete sample

	For 6 cubes	For 6 beams
Mass of cement	13.3 Kg	19.6 Kg
Mass of fine aggragate (CDW)	11.6 Kg	17.1 Kg
Mass of coarse aggregate (CDW)	28.6 Kg	42.4 Kg
Water	5.3 Kg	7.9 Kg

Fig-3: Mould of cube & beam

Fig-4: Compressive strength and Flexural Strength test

IV. RESULT & DISCUSSIONS

Table-2

Test results

Concrete using CDW	7days	28days
Compressive strength	20.74 N/mm^2	31.22 N/mm^2
Flexural strength	4.04 N/mm^2	4.23 N/mm^2

1. The results shows that the value we got is greater than the target strength of a nominal M_{20} mix.
2. By adopting this method ,we get the same strength of nominal concrete without using ordinary coarse and fine aggregate.
3. Comparing the cost, we can deduct the cost of sand or aggregate without decreasing the quality.

V. CONCLUSIONS

1. Constuction and demolition waste increasing over last 10 years due to tremendous renovation and demolition

of existing structures. The dumped CDW waste leads to the large consumption of land. By increasing CDW landfills space conserved, there by conserving precious land resources.

2. The tested concrete samples has comparatively similar strenghts that of ordinary concrete.
3. Since waste materials are used total cost of materials is very less. Crushing charge and labour charge are only involved, hence expenditure is comparitively very less and affordable for all.

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