High Strength Light Weight Concrete

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***Abstract*- This project represents the effects of using alccofine material in high strength concrete of M45 grade and rubber crumbed material for making that light weight concrete of this cube specimen. We are partially replacing some Portland cement in design mix-1, alccofine 20% by weight of binder (cement). Alccofine replace varies from 15 to 25 % .These types of concrete contain alccofine materials with different proportion in addition to ordinary Portland cement concrete were investigation and tests for compressive strength for ages 7days and 28days. The 3 cubes of 150 x 150 x 150mm were test for compressive strength and reported on average of these results. The 3 cylinders having diameter of 150 mm and height of 300 mm tested on 7 days and 28 days and flexural strength and reported on average of these results. After that we have replace the fine and coarse aggregate with different types of crumb rubber respectively. The main aim of replacing the aggregate to crumb rubber is to make the concrete considerably light in weight. We replace fine and coarse aggregate respectively with crumb rubber in proportion 5 to 15%. We casted a cube and measured their compressive strength. After that we combine the both material with their optimum percentage and 0made a cube of their combination and measured its compressive strength.**

***Index terms*- Alccofine, Crumb rubber, Cement, Coarse Aggregate, Water**

I.INTRODUCTION

Development of construction materials which gives technical and environmental benefits is the main challenge of the new world. The usage of mix cement is growing very rapidly in construction world because of the considerations of saving cost and also due to environmental safety. This project represents the effect of using alccofine material in high strength concrete with M45 grade concrete. We are partially replacing some amount of Portland cement in mix-1. Cement replacement varies from 15 to 25 %. These types of concrete alccofine material with different proportion in addition to the ordinary Portland cement concrete were investigation and tests for compressive strength for ages 7days and 28days. By the 3 cubes of 150 x 150 x 150mm were test for compressive strength and reported on average of these results. The 3 cylinders having diameter of 150 mm and height 300 mm tested on 7 days and 28 days and reported on average of these results. The motto of this study is to determine the difference between strength & durability of binary blend concrete and normal concrete. After that we have replace the fine and coarse aggregate with different types of crumb rubber respectively. The main aim of replacing the aggregate to crumb rubber is to make the concrete considerably light in weight. We replace fine and coarse aggregate respectively with crumb rubber in proportion of 5 to 15%. We casted a cube and measured their compressive strength. After that we combine the both material with their optimum percentage and made a cube of their combination and measured its compressive strength. The main objective of this project is to make a light weight concrete without compromising its strength.

II. EXPERIMENTAL MATERIAL

Alccofine: -

Alccofine is specially processed product which based on slag of high glass content with high reactivity obtained through the process of controlled granulation. Its application standards are relevant to IS 12089-1987.Alccofine is a new generation, ultra-micro fine material of particle size far much smaller than other materials like cement, fly ash etc. manufactured in India. It has unique characteristics to improve 'performance of concrete' in fresh and hardened states. It can be used as practical substitute for cement. There are two types of alccofine product. And both have used for different purpose.

Crumb rubber: -

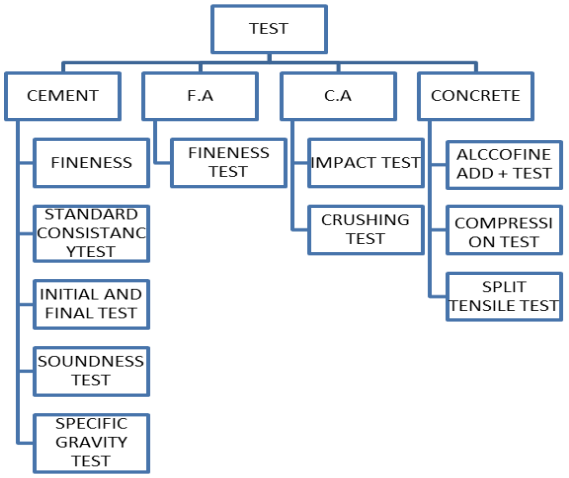
The rubber crumb is obtained from recycling industry where old used tires are shredder in to small pieces, The size of rubber crumb obtained was below 4.75 mm. The specific gravity of tire rubber is 1.07. The crumb rubber is used in the concrete mix to partially substitute for fine aggregates (sand) in various percentages of 0%, 5%, 10% and 15%.The main resource of rubber crumb is from the rubber using industries. By using the crumb rubber, the strength should be reduced and it make the concrete lighter than its usual weight.

III. MIX DESIGN

Cement concrete mix design means, determination of the proportion of the ingredients i.e. cement, water, fine aggregate, coarse aggregate which would produce concrete possessing specified properties such as workability, strength and durability with maximum overall economy. A mix M45 grade was designed as per Indian Standard method (IS 10262-2009) and the same was used to prepare the test samples. The design mix proportion is in the table below.

Grade	M-45
Cement(kg/m)	418.74
Water(kg/m))	189.79
sand(kg/m)	592.79
Coarse aggregate(kg/m)	1220

IV. EXPERIMENTAL METHODOLOGY



V. RESULTS

1. Strength of concrete with 20% alccofine and crumb rubber (fine powder)

	20% alccofine by weight of cement (compression strength in N/mm^2)			
Rubber crumb (powder form)	0%	5%	10%	15%
7 days	42	39.75	36.36	32.58
28 days	55	49.02	43.65	41.41

2. Strength of concrete with 20% alccofine and crumb rubber (fibered)

	20% alccofine by weight of cement (compression strength in N/mm^2)			
Rubber crumb (fibered)	0%	5%	10%	15%
7 days	42	37.30	32.81	30
28 days	55	47	42.97	40.32

3. Strength of concrete with 20% alccofine and crumb rubber (wired)

	20% alccofine by weight of cement (compression strength in N/mm^2)			
Rubber crumb (wired)	0%	5%	10%	15%
7 days	42	34.22	32.30	29.08
28 days	55	42.37	40.74	38.73

VI. CONCLUTION

Our main goal is to make lightweight high strength concrete with use of alccofine and rubber crumb. We have made high strength concrete with use of alccofine with proportion of 15% to 25% of weight of cement. We also added rubber crumb in 5% to 15% with replacement of fine aggregate to make the concrete lighter in weight. Because of using the waste tyre rubber crumb the rate of pollution can be reduced at considerable amount, and also by using rubber crumb as fine aggregate concrete get lighter. By using this kind of mix proportion gives an economical and ecofriendly concrete. All over cost of high strength light weight can be drag down by using combination which stated above report.

ESTIMATED PRIZE:-

- Cost for 1 m^3 concrete (M45) = 5980 RS.
- Cost for 1 m^3 concrete (M45) with 20% alccofine = 7620 RS.

Compression strength = 56 N/mm^2

- Alccofine = 26Rs/kg, available 25 kg bag - 650Rs.

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