

MODERN CONCRETE

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ABSTRACT: - The global use of concrete is second only to water. As the demand for concrete as a material increase, so also the demand for Portland cement. It is estimated that the production of cement will increase from about 1.5 billion tones in 1995 to 2.2 billion tons in 2010 to high. Manufacturing this concrete requires judicious use of natural resources and lower environmental impact in comparison with conventional concrete. This is generally achieved for manufacturing of concrete. This can be achieved by recycling of industrial by-products such as coal ash, wood and other types of biomass ash, pulp and paper mills residual solids, silica fume, and other similar material and post-consumer material such as used tyre, plastics, glass, waste, recycled concrete pavement, construction and other similar materials. The Modern concrete with a much lower environmental footprint shows considerable promise for application in the concrete industries.

Keywords: Concrete Mix, use of plastic waste, raw material, mix design

1. INTRODUCTION

Manufacturing processes, service industries and municipal solid wastes are the sources of production of numerous waste materials. Concerns related with disposal of the generated wastes have tremendously increased with the increasing awareness about the environment. Solid waste management is one of the major environmental concerns in the world. Waste utilization has become an attractive alternative to disposal because of the scarcity of space for land filling and due to its ever increasing cost. The use of waste products in concrete not only makes it economical, but also helps in reducing disposal problems.



2. PRE-PROCEDURE OF EXPERIMENT

2.1. User

In this stage, we find the various users which are directly or indirectly related to our project.

For example:

Civil Engineer: He works on the field according to design, and construct the structure on the earth surface.

Environmental Engineer: Environmental engineer measures the effect of this product on the atmosphere, and give solution to solve the problem if occurs during the measurement.

Operator: Operates the machines used on field of civil work like; concrete mixer, Mixture truck, etc.

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Worker : Work according to the instruction of contractor and do work like plaster, wall finishing.

Builder : he finance the project , he had the responsibility of selling the project.

Contractor : He supervise the project and carried out work from the labors.

2.2. Activities

Activities are directly or indirectly related to stakeholders.

Testing: To check the physical as well as chemical properties.

Mixing: To decide perfect proportion of concrete ingredient.

Manufacturing: After testing and mixing manufacturing of the concrete block.

Marketing: After production of product marketing is 1st requirement.eg, advertisement, banners.

Transporting: For construction of any structure the transportation is very important process.

Construction: it is important very important activity, in this activity the material (here, concrete) is used first time. And that come in public use for first time.

Casting: The proper making of the concrete paste is very important hence for it proper casting of skilled labor plays very important role.

Quality control: After implementation of the product the maintenance is very important and in case of concrete quality maintenance plays important role.

3. PRODUCT DEVELOPEMENT

Third step is development of the product. From possible solutions, you have idea about what is product? In this following things is to do.

3.1. Purpose:

Increase strength, high workability, less emission of CO_2 Environmental protection.

3.2. People:

Civil Engineer: He works on the field according to design , and construct the structure on the earth surface.

Environmental Engineer: Environmental engineer measures the effect of this product on the atmosphere , and give solution to solve the problem if occurs during the measurement.

R & B department: It pass the tender. He works on the field according to design , and construct the structure on the earth surface .he finance the project , he had the responsibility of selling the project

Operators :Operates the machines used on field of civil work like; concrete mixer , JCB ,etc.

Physical laboratory: To check physical properties such as, compression , tension , Durability.

Chemical laboratory: To check the chemical properties such as water absorption, admixture type, w/c ratio.

3.3 Product Experience:

This product is having a high strength.Production is easy.Cost may not effect on common men

3.4. Product functions:

High strength

Better bonding

Stability

Adhesion

Good compressive strength

3.5. Product Features:

Less emission of CO_2

Maintain temperature gap of at least 3to4%

Safe for environment

Eco-friendly

3.6. Components:

Concrete= sand+ water+ cement+ c.a + admixture+ plastic, waste material, etc.

4. DESIGN PROCEDURE

MIX-DESIGN OF CONCRETE (M-35)

Cement Grade = 53 (OPC 53 grade)

Concrete =M35

w/c ratio = 0.52

specific gravity of cement = 3.15

specific gravity of coarse aggregate = 2.70

specific gravity of fine aggregate = 2.65

Aggregate size = 20mm

Quality control= Good

Exposure condition=mild
 Density of cement=1440 kg/m³
 Density of C.A=1650 kg/m³
 Density of F.A=1800kg/m³
 Mean strength:
 $f_{ck} = 35 + s T_c$
 $= 35 + 5 (1.65)$
 $f_{ck} = 43.25 \text{ N/mm}^2$
 W/c Ratio : 0.52
 Water content = 186 lit
 Volume of Aggregate :

	Water	sand
Aggregate absolute volume 35%	+ 3	
Decrease w/c ratio = 0.60 - 0.52 = 0.08	+ 3	- 1.6
Increasing compaction factor = 0.9-0.8= 0.1		- 1.5
	+ 3	- 3.1

SAND ZONE - 3

35- 3.1 = 31.91 %

Water Content : 186 + 5.5 : 191.58 lit/ m³

Cement content:

$$0.52 = \frac{191.58}{C}$$

$$C = 368.30 \text{ kg/m}^3$$

Aggregate Content:

$$V = [w + c/S_c + 1/(1-p) * C_a / S C_a] * 1/1000$$

$$0.98 = [191.58 + 368.30/3.15 + 1/(1-0.319) + C_a/2.65] * 1/1000$$

$$C_a = 1220.91 \text{ kg/m}^3$$

Mix proportion :

$$\text{Cement Content} = 368.30 \text{ kg/m}^3$$

$$\text{Water content} = 191.58 \text{ lit/m}^3$$

$$\text{F.A Content} = 564.28 \text{ kg/m}^3$$

$$\text{C.A Content} = 1220.91 \text{ kg/m}^3$$

Cement	Fine Aggregate	Course Aggregate	Water
$\frac{368.30}{368.30}$	$\frac{564.28}{368.30}$	$\frac{1220.91}{368.30}$	$\frac{191.58}{368.30}$
1	1.53	3.31	0.52

$$\text{Volume Of One cube} = 0.15 * 0.15 * 0.15$$

$$= 0.003375 \text{ m}^3$$

$$\text{Mass of concrete required} = \text{Vol. of cube} * \text{Density}$$

$$= 0.003375 * 2400$$

$$= 8.1 \text{ kg}$$

$$\text{Concrete required for 6 cubes} = 6 * 8.1$$

$$= 48.6 \text{ kg}$$

$$\text{Considering Wastage required concrete} = 60 \text{ kg}$$

$$M_{35} \text{ Proportion} = 1:1.53:3.31$$

$$\text{Quantity of Cement Required} = 60/5.84 = 10.27 \text{ kg} \quad \text{Quantity of F.A Required} = 10.27 * 1.53 = 15.71 \text{ kg}$$

$$\text{Quantity of Cement Required} = 10.27 * 3.31 = 33.91 \text{ kg} \quad \text{Water Required for the Mix Design} = 5.29 \text{ lit}$$

5. CONCLUSIONS

From the above mentioned work of various researchers and our present experimental work, it is clear that glass can be used as a partial replacement of cement in concrete because of its increased workability, strength parameters like compressive strength, flexural strength and split tensile strength and also because of its increased durability measured by water absorption test and sorptivity test. As disposal of waste by-products problem is a major problem in today's world due to limited landfill space as well as its escalating prices for disposal, utilization of waste glass in concrete will not only provide economy, it will also help in reducing disposal problems.

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