EXPERIMENTAL STUDY OF GEO POLYMER BRICKS USING WASTE PLASTICS

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Abstract
Efforts are needed to developed for environment friendly construction materials in order to reduce green house gas pollution that are not eco- friendly. The plastic waste are which possess serious disposal problems and the biggest issue in the environment. There has been considerable imbalance between the availability of conventional building materials and their demand in the recent past. In Geopolymer brick, such as low calcium(class F) fly-ash , m-sand and other unreacted materials are used in the mix. The test result are demonstrated that showed excellent potential of Geopolymer brick to be a material of choice for future construction especially under water construction.

Keywords: plastic, Environment, flyash, m-sand, green house gas eco friendly, under water construction

1. INTRODUCTION

Geopolymer are inorganic polymeric binding materials developed by Joseph Davidovits in 1970s. Geopolymerisation involves a chemical reaction between solid alumina silicate oxides and alkali metal silicate solutions under highly alkaline conditions yielding amorphous tosemi-crystalline three dimensionalPolymeric structures, which consist of Si-O-Al bonds (Palomoetal, 1999). The polymerization process involves a substantially fast chemical reaction under alkaline condition on Si-Al minerals, which results in a three dimensional polymeric chain and ring structure shown in equation which consists of Si-O-Al-O bonds (Davidovits 1999).

Mn [-(SiO2) z–AlO2] n. wH2O ….

Durability is defined as the capability of concrete to resist weathering action, chemical attack and abrasion while maintaining its desired engineering properties.Durability is not always an absolute property since different forms of concrete require different degrees of durability depending upon its use. The durability of concrete has been evaluated in this study through parameters related to the permeability and chemical attack.

Plastic material is a made up of resin which is easy to change it form. Pieces Polyethylene bag which are commonly used for the packaging and carrying goods are used in concrete**.** Used Plastic bags, pieces of plastic sheets and bottles of diverse sizes, colors and textures are found flying around freely, scattered in the streets, swimming in the gutters, posing a serious environmental threat. Metals in general have a high surface energy and are easier to bond with concrete, whereas plastics have a lower surface energy & are harder to bond with concrete. Hence, the decrease in compressive strength has been absorbed as waste shredded plastic content increases in the concrete mix.

OBJECTIVE

1. The main target of this study is to analyze the carbon dioxide free cementitious material, various properties and their effects on geo polymer concrete
2. The efficient usage of waste plastic in plastic bricks has resulted in effective usage of plastic and thereby can solve the problem of safe disposal of plastics, also avoid its wide spread littering
3. A present study aims at evaluating the

performance of plastic for paver block use in pavement and other application areas

SCOPE OF OUR PROJECT

1. The reduce the co emissions of plastic bricks
2. To control the environment pollution and remove waste plastic on society
3. The plastic are using show many problems, effects are affected on human and animals. The plastic is a toxicity materials

2. METHODOLOGY

- Literature collection and study
- Material collection and study
- Test on material properties
- Mix proportion
- Casting of specimens
- Testing on specimens
- Result and discussion
- Conclusion
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MATERIAL USED

M Sand

Table 2.1.1 Physical properties of M Sand

S.No	Test for fine aggregates	Apparatus	Value obtained
1.	Fineness modulus	Sieve	2.4
2.	Specific gravity	Pycnometer	2.7
3.	Water absorption	-	1.6%

PLASTIC

Table 2.1.2 Physical properties of plastics

Coefficient of Thermal Expansion	7 x 10-3/ºC
Long Term Service Temperature	115 - 170ºC
Melting point	120°C-180°C
Specific Gravity	1.3 – 1.4
Water Absorption	0.07– 0.10%

FLY ASH

Table 2.1.3 Physical properties of fly ash

S.No	Test for fly ash	Apparatus	Value Obtained
1.	Water absorption		1.2%
2.	Specific gravity test	Conical flask	2.5

3.MIXproportion

3.1Concrete mix proportion

Proportioning of raw materials is an important aspects of ensuring quality of Geopolymer bricks. The proportion will depend on the quality of the raw materials

Table 3.1.1 Mix proportion

PROPERTIES	FLY ASH (%)	M-SAND (%)	PLASTIC (%)
I	45	45	10
II	42.5	42.5	15
III	40	40	20

Table No 3.1.2 Quantity of material used

PROPERTIES	FLY ASH (kg)	SAND STONE (kg)	PLASTIC (kg)
I	1.57	1.57	0.35
II	1.48	1.48	0.525
III	1.4	1.4	0.7

4.TEST ON SPEICEMEN

Table 4.1 Compressive strength test

PROPORTION	COMPRESSIVE STRENGTH (N/mm^2)
I(10%plastic)	**8.6**
II(15%plastic)	**11.36**
III(20%plastic)	**14.09**

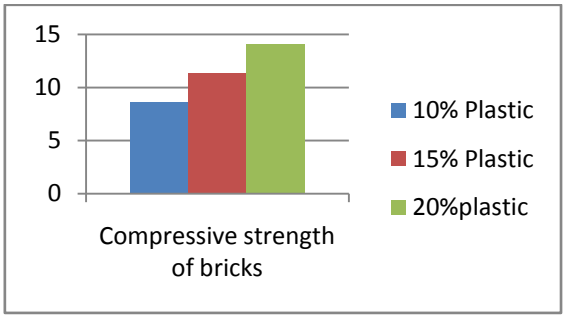
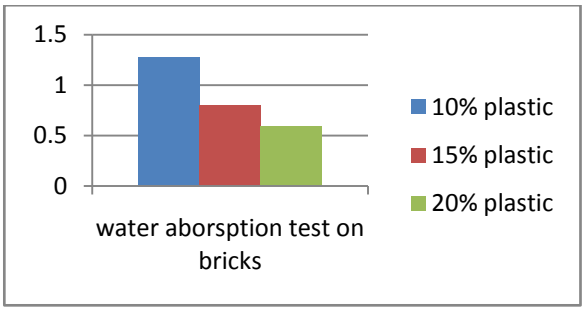


Table 4.2 water absorption brick

Proportion	Water absorption %
I(10%plastic)	1.28
II(15%plastic)	0.8
III	0.59



EFFLORESCENCE TEST

Efflorescence is a whitish crystalline deposit on surface of the bricks. usually magnesium sulphate, calcium sulphate and carbonate of sodium and potassium are found in efflorescence .The movement of groundwater into the foundation of the buildings and by capillary action into bricks is very often the cause of efflorescence

RESULT

Result of efflorescence test is reported as Nil

5.COST ANALYSIS

Table 5.1 cost of brick- proportion I

MATERIALS	PROPOTION%	WT Kg	COST/Kg	TOTAL COST(RS)
Fly ash	45	1.75	0.8	1.256
M-sand	45	1.75	0.5	0.785
Plastic	10	0.35	0.35	0.7

TOTAL=RS 2.7

Table5.2 cost of brick- proportion II

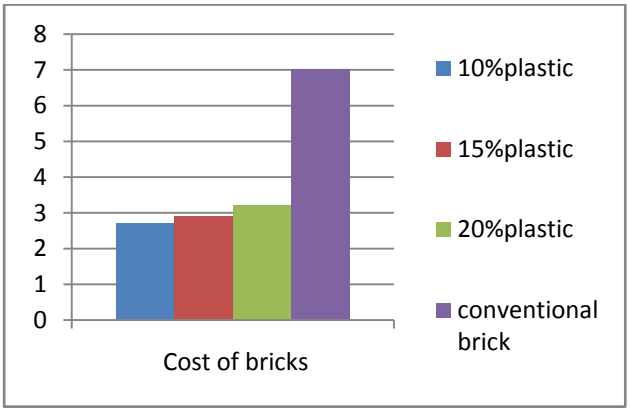
MATERIALS	PROPOTION %	WT Kg	COST/ Kg	TOTAL COST(RS)
Fly ash	42.5	1.48	0.8	1.184
M-sand	42.5	1.48	0.5	0.74
Plastic	15	0.525	0.35	1.05

TOTAL=RS 2.9

Table 5.3 cost of brick- proportion III

MATERIALS	PROPOTION %	WT Kg	COST/ Kg	TOTAL COST(RS)
Fly ash	40	1.4	0.8	1.12
M-sand	40	1.4	0.5	0.7
Plastic	20	0.7	0.35	1.4

TOTAL=RS 3.22



3. CONCLUSION

From the results obtained from these studies the following conclusions can be drawn:

The strength of the specimen of brick was summarized. The other brick test is depended on the materials used for the brick proportions with replacement of fine aggregate as waste plastic material. In general the strength was increased with increased percentage of wastes replacing of normal brick. From the experimental investigation we found that the compressive strength and other brick test while compare with normal bricks strength behavior. The other test results are compare with plastic brick is good conditions and behavior. In this brick more than the normal brick all the air voids can arrest by the cracks to the brick. The cost of brick cost is reduced. If the environmental pollution are reduced to direct and indirect manner.The method used to reduce the plastic and safe disposal. To control the global effects and environmental pollution.

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